DOCUMENT RESUME

ED 351 464 CE 062 194

AUTHOR	Kreutz, Eileen
TITLE	In for a Change. A Curriculum Guide for Pre-Apprenticeship Training.
INSTITUTION	Chicago Women in Trades, IL.
SPONS AGENCY	Illinois State Board of Education, Springfield. Dept. of Adult, Vocational and Technical Education.
PUB DATE	Jan 92
NOTE	73p.
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Adult Education; Adult Vocational Education; Change Strategies; Curriculum Guides; *Equal Opportunities (Jobs); Job Skills; Job Training; Labor Force Development; Learning Modules; Mathematics Instruction; *Nontraditional Occupations; Resistance to Change; *Skilled Occupations; *Skilled Workers; Social Support Groups; Trade and Industrial Education; *Womens Education
IDENTIFIERS	*Chicago Women in Trades; *Preapprenticeship Programs

ABSTRACT

This manual is the curriculum guide used by Chicago Women in Trades (CWIT) to run its 10-week pre-apprenticeship training program that is designed to help women who are interested in the skilled trades prepare for the mental, physical, and psychological demands of this work. Information on the training sequence includes material on recruitment and interviews, orientation for program participants, course content, and course schedule. Information is also provided on the support group component, which includes exercises on such subjects as networking, self-esteem, goal-setting, job search, map reading, legal rights, and a survival skills notebook. The manual describes lessons on the following topics: mathematics, measurement and geometry, algebra and utilization of formulas, blueprint reading, techniques of interviewing and job search, physical conditioning and nutrition, and mechanical- and trade-specific information and skills. The counseling component of the program and future plans are also described. Contents of the appendices are as follows: list of organizations that provide training, support, and advocacy for women in nontraditional jobs; a copy of a brochure available from CWIT; the CWIT Pre-apprenticeship Tutorial Workshop Application; and a copy of a 1991 orientation schedule. A bibliography lists 18 books, 3 films, 2 periodicals, and 8 videotapes and slideshows. (CML)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED351464

IN FOR A CHANGE

A Curriculum Guide for Pre-Apprenticeship Training

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

by Eileen Kreutz
Training Coordinator

Chicago Women in Trades
37 S. Ashland
Chicago, Illinois 60607
312-942-1444

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Project Staff:
Lauren Sugerman, Director
Paula Gomez, Counselor
Patti Ushkow, Office Manager
Julie Zolot, Graphic Designer

Illinois State Board of Education
Louis Mervis
Chairman

Robert Leininger
State Superintendent of Education

Adult, Vocational and Technical Education

Vocational Education Program Improvement Section

January, 1992

NM-AF-250

An Equal Opportunity/Affirmative Action Employer

2

BEST COPY AVAILABLE

CE062194

In For A Change
A Curriculum Guide
for Pre-Apprenticeship Training

by
Eileen Kreutz

© Chicago Women In Trades, 1992

This publication was prepared pursuant to a grant with the Illinois State Board of Education, Department of Adult, Vocational and Technical Education and funded 100% through the Carl D. Perkins Vocational Education Act. Grantees are encouraged to freely express their judgements in professional and technical matters. However, points of view or opinions do not necessarily represent official Illinois State Board of Education position or policy.

ILLINOIS STATE BOARD OF EDUCATION
100 North First Street, Springfield, Illinois 62777-0001
Louis Mervis, Chairman
Robert Leininger, State Superintendent
An Equal Opportunity/Affirmative Action Employer
Printed by the Authority of the State of Illinois

TABLE OF CONTENTS

OVERVIEW

Introduction 1

History of the Organization 4

Pre-Apprenticeship Training 5

THE TRAINING SEQUENCE

Recruitment and Interviews 7

Orientation 8

Course Content 9

Course Schedule 10

THE SUPPORT GROUP COMPONENT

Philosophy 14

Support Group Exercises

I. Networking Exercises 16
II. Self-Esteem Exercises 18
III. Goal-Setting Exercises 20
IV. Job Search 21
V. Apprenticeship Information Center 22
VI. Map Reading 22
VII. Legal Rights Presentation 23
VIII. Survival Skills Notebook 23
IX. Journal Writing 24
X. Job Readiness Kit 25

THE LESSON PLANS

Mathematics 27

I. Whole Numbers 28
II. Order of Operations 28
III. Common Fractions 29
IV. Combined Operations with Fractions 30
V. Decimals 31
VI. Exponents and Square Roots 32
VII. Percentage Problems in the Trades 32

Measurement and Geometry....33

I. Linear Measurement....33
II. Perimeter and Area....34
III. Triangles....35
IV. Volume....36
V. Formulas Involving Circles....36
VI. Use of the Pythagorean Theorem....37
VII. Angles....38
VIII. Material Estimation....39

Algebra and Utilization of Formulas....40

I. Signed Numbers....40
II. Equations....41

Blueprint Reading....41

Techniques of Interviewing and Job Search....43

Physical Conditioning and Nutrition....44

Mechanical and Trade Specifics....45

I. Hands-On Training....46
II. Trade Specific Presentations....49
III. Safety....50
IV. Field Trips....52

THE COUNSELING COMPONENT

FUTURE DIRECTIONS

I. Childcare....55
II. Ongoing Study Groups....55
III. Revolving Fund for New Apprentices....56
IV. Institutionalization of Curriculum....56

APPENDICES

Bibliography....(Ap)1
Tradeswomen's Organizations....(Ap)3
Recruitment Materials....(Ap)4
Application....(Ap)5
Interview Materials....(Ap)7
Orientation Day Schedule....(Ap)8
Syllabus....(Ap)9
Schedule of Presentations....(Ap)12

OVERVIEW

INTRODUCTION

The existing U.S. labor force is in for a change. Actually, it is about to undergo one of the most sweeping transformations in its composition in more than a half-century. Simply stated, women are about to enter the skilled trades in numbers never seen before. The combination of changing demographics and conditions described herein will conspire to bring about this transformation.

It has been known by tradeswomen's organizations for some time now that there was need for such a change. Women in particular knew that the labor force was long overdue for opening its doors to a more diverse workforce. Now, at last, even the numbers in the selection pool are changing, and the employers will move more and more to the available women to fill the bill. The developers will see that a diversified workforce will bring the best workers.

During the 1990's, according to the Department of Labor study, *Workforce 2000*, the general pool of people entering the workforce will be 28% native women of color and 21% native white women, with an additional 9% comprised of immigrant women. This 58% figure represents far more than a mere majority of those entering the work force. It represents sweeping changes in industry, construction, and the way in which women are viewed in the skilled trades.

In addition to these changing demographics, it is a known fact that the nation has an aging trades and technological workforce. The majority of jobs in the trades are currently held by near-retirement-age white males. As more and more of those men move ahead with retirement plans, their positions become available for the first time in nearly fifty years. Concurrent with this event, during the next ten years, the U.S. population will grow more slowly than it has since the 1930s.

More remarkable than the numbers alone is the make-up of those persons who will be available to fill the vacancies. Nearly 60% of the slowly-growing work force will be made up of women starting or returning to work, (roughly in the percentage brackets shown above).

Another way of looking at this is that by the year 2000, nearly two out of every three new workers will be women. Minority males and immigrants will account for an additional 30% of those entering the work force. Only 9% of the new workers will fit the long-lived stereotype of the white male construction worker. (*Time* Magazine, Fall, 1990, "Get Set: Here They Come!")

Without a doubt, the statistical shifts at the doorstep offer a deeper and more sweeping change in the employment scenario than any affirmative action guidelines alone could have brought about. While it will be essential for women's organizations to continue to press for progressive movement and enforcement of sex equity legislation, the changing numbers will offer more and more opportunity for capable women to move into management positions. It is hoped that from these positions, women will be able to help bring about real changes in the quality and safety of the work place, stretching even to the value systems surrounding the worker.

Over the past ten to fifteen years, we have seen the birth of organizations whose purpose has been to rally for jobs for tradeswomen and to advocate on their behalf. These organizations, along with government bodies, set certain statistical expectations that up to this point have yet to be achieved. Although the number of women in the skilled trades is growing, it has grown at a very slow rate, with many new tradeswomen leaving the field after a few years.

While it was hoped that the percentage of women in the trades would reach 20% by the early 1990s, it still hovers at a nationwide average of 8-9%. This percentage is higher in some industrial and metropolitan areas, but the average remains far below expectations. However, the figure has a very real chance of steadily increasing now. From the pioneering efforts of tradeswomen's groups, it is much easier to find role models of women working in the trades.

It could be said that many groups, including government bodies, were merely setting statistical expectations that predicted too rapid a growth in the number of tradeswomen. Or, it could well be that the level of resistance to change within the trade and technological arena was stronger than expected. While women's organizations did much to help change the image of acceptable occupations for women, all of this groundwork took longer than imagined.

The same is true for an individual woman's transition from a traditional role (homemaker, secretary) into a skilled trade. It does not take place overnight, and much preparation is needed, as this manual will show. For instance, it takes years for a woman (after she has made her decision to enter the trades) to actually be accepted into one, and then two to five years as an apprentice to reach journey level status in her trade. Over the past ten to fifteen years, tradeswomen's organizations laid a very critical groundwork for women desiring to enter the skilled trades. Now the fruits of that work are coming to reality.

The pivotal point at this time is whether women, having gained entrance to the trades, will choose to continue to work in the field over many years. Perseverance, inner strength and self-esteem are factors around which training programs must focus their energies. Support group meetings, providing quality programs, will help accomplish this goal. Furthermore, tradeswomen's organizations must directly confront conditions in the industry which are contributing to women dropping out of the field. Changing the environment, by ridding it of the reasons around which women leave, will have a profound effect on the statistics and quality of life revolving around work in the trades.

As part of the efforts of such groups to assist women interested in entering the construction or manufacturing fields, there evolved throughout the country training programs of the type detailed in this manual. Such pre-apprenticeship training programs have filled a void, offering to participants an opportunity to gain "hands-on" and classroom skills experience necessary to enter and survive in the trades.

Chicago Women In Trades offers one such program, responding to needs of women who are working days or part-time, but who have Saturdays and evenings free. This training is available to women on public assistance and to women who are unemployed, as well as to those who have present occupations but are planning to make a career change.

The training offers women an overview of the skilled trades, teaches math and physical conditioning skills, introduces hands-on activities in a number of trades and assists in following the procedures necessary for gaining entrance into the trade of their choice. Upon completion of the program, women are prepared to pass entrance exams for union apprenticeships, and after working for 3 to 4 years as apprentices, achieve journey level status.

A second goal of the program, that of teaching safe work habits and safe use of tools is incorporated into the hands-on training segment. Tool recognition skills have stood as a major impediment to women trying to pass entrance exams. Recognition of tools and their safe use is a critical body of knowledge in any such training program. Safety is a major focus throughout the course. It helps to keep the class participants safe in their work and, more importantly, it helps move the construction industry as a whole towards a stronger emphasis on safety.

Equally important to gaining entrance into the trades, however, is developing the inner strength to persevere in a work world primarily occupied by males. The support group component of the training offered by Chicago Women in Trades focuses on the realities of day-to-day work on construction sites. Long conversations and interview sessions with working tradeswomen give a realistic view and help applicants develop their own strategies for encounters with everything from bad weather to sexual harassment. One goal of each class sequence is that the students will form an ongoing support group, calling on one another to talk over difficulties as well as successes.

Be it the strengthening of mathematical knowledge or new insights into self-esteem and inner confidence, this is a course sequence built around empowerment. It begins on a very individual level, working intensively with each program participant to improve skills necessary to entering the trades. In the end, though, the goal is not individualistic at all, but rather one which sees large numbers of women entering, and continuing to work successfully in, the skilled trade of their choice.

* * * *

This manual is the curriculum guide for the pre-apprenticeship training program run by Chicago Women In Trades (CWIT). The guide is meant to be used to direct the training sequence for the ten-week training program run by the organization. This training is designed to reach out to women who are interested in the skilled trades and to help them prepare for the mental, physical and psychological demands of working in the trades.

This manual describes the entire sequence followed by the training and counseling staff in the execution of the course. It is hoped that this guide could be of use to new training programs in their program design, as well as being the teacher's guide for additional sites should the CWIT program expand its schedule to offer more than one sequence at a time.

At a local level, a curriculum of this type could one day be institutionalized into Community College programs, part of the regularly offered course of studies. Along the same lines, the construction and technical industries might make use of some of the material herein in their training programs. Or perhaps a collaboration between tradeswomen's organizations and employers could bring about jointly-run training programs of this type.

An additional possibility for the use of this manual is that the content may be helpful to those working with special groups of women; for instance, the self-esteem exercises might be adapted for exercises with women recently incarcerated, with displaced homemakers, or with high school age women interested in non-traditional occupations. At whatever level and with whatever group this manual comes to be used, it is hoped that it may act as a vehicle for empowerment for women, and help open new vistas wherever it goes.

HISTORY OF THE ORGANIZATION

Chicago Women In Trades is the only organization in Chicago composed exclusively of tradeswomen. Members work in the construction and manufacturing fields as electricians, machinists, carpenters, auto mechanics, elevator constructors, painters, and laborers.

The organization dates back to 1980, when a small group of women working in the trades met each month for a potluck dinner. The goal of these early meetings was to provide support for women persevering in non-traditional professions. Non-traditional careers are commonly defined as those occupations in which fewer than 25% of the jobs are held by workers of one sex. CWIT has specifically focused its activities and programs on non-traditional careers in the blue collar industrial, service and construction fields.

Often, women at the early support group meetings were faced with the daily reality of being the only woman on a worksite. Before long, these pioneers began to look for answers to the problems of discrimination that were coming up again and again. Efforts were begun to change unfair conditions and to increase the ranks of women in the skilled trades.

For several years, volunteer energy and small donations supported a wide range of energetic programs, including monthly support group meetings, movies, slide shows, counseling and/or tutoring sessions with tradeswomen "aspirants," and advocacy efforts around tradeswomen's concerns in the private and public sectors. The organization instituted a regularly published newsletter and worked on gathering information for a slideshow on women in the trades.

Advocacy efforts began early on, working to stop the Reagan administration revisions to the affirmative action laws in the 1980s. In addition to the national focus, these tradeswomen also focused on state and city issues, working for local ordinances requiring that publicly-funded contractors hire women and minorities. At times, charges of discrimination were pursued through legal actions. Present efforts include working with a major developer to create a model project to recruit, place and retain women on commercial high-rise construction. To date, this project has employed more than seventy women.

* * * *

Since 1986, CWIT has functioned with a gradually increasing number of paid staff, and some early efforts have developed into full-time pursuits, such as a new Legal Research Project. The primary goal remains to support women working in the trades and to increase their numbers. Tutoring has evolved into formalized pre-apprenticeship training classes, offered each spring and fall.

A job hotline now provides job referrals and assists contractors in locating women for work. Advocacy efforts continue to increase, including class action suits on behalf of women contesting age limitations for entrance to union programs. Informal counseling has expanded to include quarterly orientations for women interested in the trades, periodic mini-orientations, and an annual non-traditional jobs fair.

The organization continues to build on its earliest foundations, as monthly support group meetings are set up by the job counselor on topics that provide new information to tradeswomen. Now full-time counselors provide assistance on work-related issues to women already in the

trades and those interested in entering them. The newsletter has evolved into a twelve-page packet, published three times a year. In addition, CWIT has helped sponsor the development of a National Tradeswomen's Network and hosted a national conference in Chicago in 1989.

The pre-apprenticeship training offered by CWIT has grown with each new semester, and is now enjoying the fruits of its labor as more and more past graduates achieve entry into apprenticeships or complete those apprenticeships to gain journey level status. During one recent semester at Carpentry Apprenticeship classes, one of the only two A students (out of 200 students in all) was a graduate of CWIT's program.

Graduates of the program, having gone on to enter and complete an apprenticeship, report back that the CWIT offered everything they needed to get ready for apprenticeship training. Some have stated that the physical conditioning was most important to them; for others it was the math or measurements.

In follow-up phone calls and surveys, CWIT is currently registering over 50% placement of prior class graduates entering skilled trade jobs or apprenticeships. In addition to this survey method, a retention study is being carried out to assess the length of time women continue in the trades and the needs, if met, which would lengthen those statistics.

PRE-APPRENTICESHIP TRAINING

Chicago Women in Trades has, in a sense, been running a Pre-Apprenticeship Training Program since its inception. In the early years, tutoring took place on an informal one-to-one basis with women enrolled and experiencing difficulty in area trade schools. In 1987, the limits of this style of teaching became clear when the organization was asked to place fifteen women in the apprenticeship program run by the Electrical Workers Union. Eleven women successfully entered the program but required consistent tutoring throughout their training period.

Seeing a much larger need for this type of training, an Advisory Committee was set up to determine objectives and construct a curriculum for a training program. Goals were expanded and an effort was made to reach out to women considering work in the trades, but who had not yet filed applications or taken entrance exams to join the fields of their choice. In addition, tutoring was continued for those already enrolled in other programs.

In the fall of 1987, CWIT formalized course content and training objectives, preparing the initial curriculum for its spring training class. That class met during eight weeks in the spring of 1988. Development of the program and its first two sessions were funded by the Women's Bureau of the U.S. Department of Labor and the City Colleges of Chicago. The training curriculum described within this book involves 110 to 120 hours of class time, about half of which consists of hands-on training. The other half represents classroom instruction focusing on academic skills, women's resources, and physical conditioning.

* * * *

The success of this program can be measured in a number of ways. First and foremost, large numbers of women are being exposed to the option of a well-paying career in the trades. Orientations have often been attended by as many as 100 women, with one such meeting addressing 300 prospective tradeswomen. Classes have ranged in size from 14 to 50, with a current goal of placing no more than 25 women in any one class.

Another measurement of success lies in the increased earning power of the students. Many women began the course while still unemployed or holding subsistence minimal wage positions. Their beginning wages as apprentices (electrical, carpentry, pipefitting, crane operating, cabinet making, etc.) ranged from $8.55 to $9.68 per hour, and pay increases occur on the average of once a year.

The final measurement involves the response of the students themselves. Even though some do not go on to pursue a career in the skilled trades, all of them leave the course with an enhanced view of the strength of women and the possibilities open to them. On a more individual level, each student gains a renewed sense of personal goals and vision, a new push to achieve, an enhanced sense of self-esteem, and, in a way, a new dream.

In evaluations filled out by participants at the end of each class sequence, women have referred repeatedly to an increased sense of confidence and motivation. In addition, pre-test and final test scores demonstrate that students are learning to master the subject matter critical to their entrance into and survival within the trades.

The supportive network that classmates are building with one another as they participate in a training sequence has already come into play. Individual class members who have experienced difficult interviews have been encouraged and sent out to try again by their peers. Those completing successful application processes and gaining positions within the trades are cheered and congratulated by the women with whom they trained.

Perhaps of key importance is the amount of hands-on training that women receive during the course. All of them report huge gains in tool recognition. Everyone learns how to safely handle and care for power tools. Skills improve in the use of small hand tools for all class participants. All students convey a keen interest in this part of the course, and since every Saturday offers insight into a new trade, they learn new tools and skills with each passing week.

THE TRAINING SEQUENCE

RECRUITMENT AND INTERVIEWS

During the months between the starting dates of any two training sequences, as many as one hundred phone calls of inquiry will come into the office at Chicago Women In Trades. These names will be given priority for notification of the next orientation and training dates. A mailing is sent out containing the organization's brochure, a flyer advertising the dates of the upcoming orientation, and information on how to apply for entrance into the course.

In addition, general notification is given to the public through the use of public service announcements and press releases. A mailing of posters is sent to social service centers, welfare organizations, job counseling offices and women's organizations. If needed, posters are placed at transportation centers, (El and bus stops), park district facilities, libraries, and bookstores.

Publicity about the organization, in periodicals or on the radio, bring in numerous calls from women wanting to register for the training sequence. In addition to public relations activities, the organization engages in presentations at job fairs and school career days.

Women who then call or write that they are interested in participating in the program are given an appointment for a personal interview. At this meeting, the applicant is given a two-page form to fill out and an individual interview with a counselor takes place.

The purpose of the interview is to help the woman assess how ready she is to make the commitment to the ten-week course. Questions center around whether she has any schedule conflicts or commitments, such as young children, which could prevent her from attending classes. Childcare and back-up childcare, transportation to and from class meetings, and Saturday all-day sessions are all discussed in detail. Furthermore, the meeting offers an opportunity to discuss the woman's prior employment history, why she is drawn to non-traditional employment, and what specific trade choice she may be considering.

At the end of the interview, the applicant is given a math pre-test which helps determine math class groupings for initial classes. All other pre-tests, in measurement, tool recognition and reading comprehension, are given during the first week of classes.

Requirements for admission to the course include a G.E.D. Certificate or a High School Diploma, a valid driver's license, and a commitment to attend all classes. In addition, those without public aid waivers pay a nominal fee, most of which goes to the City Colleges. Each student is provided with notebooks, math and blueprint reading texts, and measuring tools once classes begin.

Copies of recruitment notices, an application form and sample interview questions are contained in the Appendix section of this manual.

ORIENTATION

It is expected that every applicant will attend an orientation program sponsored by the organization as part of the start-up of any training sequence. The day functions in such a way as to give those who attend an introductory understanding of the skilled trades. Every orientation day includes presentations like those listed below:

- A General Introduction to CWIT's organization
- Tradeswomen's Testimonies Regarding Their Work
- Special Presentation by a Union or Trade School
- An Overview of the Training Program, Schedule and Content.

In addition, there are displays, small group discussions, and video presentations before and after the formal program. Among them are:

- Individual Tradeswomen with their tools and portfolios of their work
- Small group meetings of women interested in taking the course
- Videos such as Trade Secrets or recordings of hands-on training done in previous classes
- Special group information tables, such as Washburne Trade School, the Apprenticeship Information Center, employers, and union representatives
- A table staffed by CWIT at which new members are accepted and questions about the organization are answered
- A photo table displaying the work of prior classes at which applicants may meet with the Training Program Coordinator and ask specific questions.

It should be noted that the Orientation Days scheduled several times a year are much more than simply a great kick-off for each training session. Since the events are so well attended, the Orientation Days serve as a mechanism for change in and of themselves. At these events, many women come in contact for the first time with other women in tool belts and hard hats, wearing safety equipment, and talking about what they do on the job.

In a similar manner, the videos and the presentations from the podium do much to convey the realities of working in the trades. The entire program serves as a vivid and proud display of women working in their career of choice, and all facets come together to make a strong impact on those attending such an event for the first time.

Once a year, CWIT sponsors a similar mechanism for change, a non-traditional Jobs Fair, which is not a formal part of this training sequence. However, women attending become interested in taking the course as a means of reaching their career goals. Also attending such a Fair are prospective employers who have a chance to experience first-hand the seriousness of tradeswomen and the enthusiasm and energy of new applicants.

COURSE CONTENT

The Course offered by Chicago Women in Trades has been evaluated by an administrator of the City Colleges of Chicag, and judged to contain the equivalent of seven three-credit Adult Education courses. The breakdown of units of study is as follows:

Math - Review of Whole Numbers, Fractions, Decimals & Percents

Measurement and Geometry as Utilized in the Trades

Algebra and Utilization of Formulas

Introduction to Blueprint Reading

Techniques of Interviewing and Job Search

Physical Conditioning and Nutrition

Hands-on and Trade Specific Training.

The first six of these content areas are taught in classroom or weightroom settings, two evenings a week, three hours a night for ten weeks. The hands-on training is conducted at the CWIT offices on Saturdays.

Mathematics classes make up 12% of total class time, and basic math is stressed in a way that emphasizes how it would be used in the skilled trades. Practical application problems and word problems are key to this learning process. Students use math and measurement during the hands-on sessions as well, helping them gain in overall proficiency.

Geometry lessons make up 8% of class time, and cover a full review of all formulas that would be used in the trades, up to and including work with angles and circles. Much attention is given to spatial configurations, and spatial relations tests, so that the students may gain familiarity with general aptitude test procedures as well.

Algebra is reviewed during the final three weeks, receiving 5% of overall class time. Generally, students respond to it very well, enjoying the challenge, and they work at their own pace through simple operations with signed numbers into multiple variable equations. Again, the use of algebra in the trades is explained, and various formulas are solved for unknown variables. Those interested in the electrical trades are encouraged to continue to study and gain more skill with algebra after the course ends, since algebra is part of the course of study for apprentice electricians.

Blueprints and mechanical symbols make up another 5% of classroom study, and large sets of blueprints are examined during hands-on sessions as well. At times, students work from drawings they have sketched to attempt a class building project. The goal is to help the students become less fearful of blueprints, and to begin to recognize various types of working drawings and what they communicate. This knowledge will be built upon in any apprenticeship program through a formal blueprint reading course.

Techniques of Interviewing and Job Search refers to what is actually a much larger focus for the program, that of the Support Services Component. Led by CWIT's counselor, women spend as much as 13% of program time in exercises that will help them build self-esteem, set realistic goals, and make successful application to the trade of their choice. This component also includes legal, job resource , and other special presentations.

Physical Conditioning, which includes both weight training and aerobic conditioning, is taught in a weight training room, dance studio and gymnasium. It comprises 12% of the total class time, and the activities vary greatly to bring about a well-rounded program.

Hands-on Trade Specific classes are led by skilled tradeswomen at the office hall on Saturdays. Since the Saturday sessions typically last five to six hours, this segment of study makes up 45-50% of class time. Tool recognition and actual experience in handling them are two criteria that prospective employers will be looking for in applicants. Hands-on sessions help the women see where their own natural abilities lie, help them find which materials they prefer to work with, and teach them to recognize and know the safe use of many hand and power tools. As previously mentioned, measuring and blueprint reading activities take place on these Saturdays as well.

To help the students form realistic expectations of what they may find in the field, various trips to construction sites, millwork shops or training schools are scheduled during the sequence.

Each of the course areas above require a series of class presentations in order to cover all the material, and that sequence is described in the Lesson Plans Section of this manual. Additional information on the rationale for including each of the areas in the curriculum is described the that section as well.

SAMPLE COURSE SCHEDULE

Week 1

Tuesday	Registration and review of syllabus Introductions, including goals Tool and measurement pre-tests Organize travel teams for safety Math: Review of pre-test; whole numbers
Thursday	Apprenticeships, structure and application process Apprenticeship Information Center presentation Counselors' introductions Interview roleplays
Saturday	Contracts and Waivers; Attendance remarks reviewed Stretching and muscle tone exercises Mechanical principles, leverage, with hands-on work Use of prying tools, hand tools, tape measures Material handling, proper lifting techniques Slide Show: "Out of Ashes Rehab"•

• A slide show created by the author on a retrofitting rehab project of a burned out six-flat building. (See Bibliography.)

Week 2

Tuesday	Physical conditioning: Introduction to weight equipment Math: Review of whole numbers and order of operations Geometry: Perimeter and area Spatial Relations: Hole punch exercise in small groups
Thursday	Physical conditioning: Upper body aerobics Math: Fractions and measurement Practical applications work: Perimeter and area Reading comprehension exercise
Saturday	Field trip to Operating Engineers Training site

Week 3

Tuesday	Physical conditioning: Weight repetition charts, aerobics Math: Fractions and prime factors Practical applications work: Small group work Blueprint reading: Complex drawings; Introduction to scale
Thursday	Physical conditioning.: Stair exercises with weights Math: Multiplication and division of fractions Geometry: Triangles Blueprint worksheets Perceptual ability work Study skills presentation Support Group work: Job search; goal-setting
Saturday	Construction site tour - U.S.G. building

Week 4

Tuesday	Physical conditioning: Nutrition lesson and workout Math: Order of operations with fractions Geometry: Volume Practical problems work in small teams: word problems
Thursday	Physical conditioning Strategies for test taking; Study skills information Last fractions review Fractions test
Saturday	Short introduction exercises involving goals Stretching and muscle toning Trade Specific: Pipefitters Hands-on work with wrenches and pipe fittings Tutoring review for midterm (optional)

Week 5

Tuesday
Physical conditioning: Stairs exercises with weights
Math: Decimals, all operation review
Geometry: Formulas involving circles
Reading comprehension and sentence completion

Thursday
Physical conditioning
Math: Word problems involving decimal review
Blueprint Reading: presentation and practice
Circle formulas for further review
Self-esteem issues and budget planning

Saturday
Stretching and muscle toning
Trade Specific: Electricians
Hands-on work with pipe bending, wiring, attaching connectors and couplings

Week 6

Tuesday
Physical conditioning: Weight lifting
Math: Square root and exponents
Geometry: Circles
Midterm exams

Thursday
Review of midterms
Final clarifications before Algebra work
Pythagorean theorem
Hands-on demonstration using 3-4-5 right triangles

Saturday
Stretching and muscle toning
Trade Specific: Carpenters
Hands on work with carpentry tools and jointery.
Class project: building utility shelves

Week 7

Tuesday
Physical conditioning: Upper body aerobics
Math: Percentages; questions on square root
Algebra: Introduction to signed numbers
Hidden Figures exercises

Thursday
Physical conditioning
Math: Hypotenuse use; stairs and rafters
Geometry: Volume of cylinders
Job Search: Interviews and employment situation roleplays

Saturday
Stretching and muscle toning
Presentation: Building Engineer; drywall, taping, trim carpentry hands-on
Use of: Mitre saw, screwguns, trim tools

Week 8

Tuesday	Physical conditioning: Balance and motor control exercises Algebra: Combination of signed numbers Blueprint reading: Architectural symbols Geometry: Angles Synonym and antonym exercises in small groups
Thursday	Support Group Meeting - CWIT office Blueprint reading - Large prints at office
Saturday	Map reading exercise in small groups Blueprint reading Trade Specific: Cabinetmaker presentation Hands-on use with routers, laminating materials

Week 9

Tuesday	Physical conditioning: Weight repetition charts Legal rights presentation Harassment survival roleplays
Thursday	Physical conditioning: Final test Algebra: Introduction to variables; Solving equations Geometry: Angles Review for Exam Final job interviews
Saturday	Stretching and muscle toning Trade Specific: Masonry Blueprint reading: Take-offs Tutoring available for final (optional)

Week 10

Tuesday	Physical conditioning; Compare start and finish charts Math, Geometry, Blueprint reading: Review, Answer Questions Final Exam
Thursday	Video Presentations: "Trade Secrets," Stein Video on Women in Trades Class Hands-on Videos Graduation Ceremony

THE SUPPORT GROUP COMPONENT

PHILOSOPHY

Fear of differences and of trying new and different things abound in our society, but are especially strong among women. The noise of a power tool alone intimidates a great many of us. Yet, for some growing number, motivation to join the trades, to be a carpenter, an electrician, a sprinkler fitter, enables a woman to step past the fears of the noise and strenuous conditions and to learn the skills involved. A fair number of odds must be overcome before a woman can see herself working at a job that has been traditionally held by a man. Likewise, she must grow in the areas of self-knowledge, self-esteem and self-confidence.

Preparing women to enter the skilled trades must of necessity mean introducing them to certain assumptions that they are likely to encounter on the job. These assumptions, held by many co-workers and employers alike, have a way of surfacing at a woman's first interview for construction work or apprenticeship training. Here are a few quotes from actual encounters:

"Why would you want to do this type of work?"

"Are you sure you can work out in the cold or the wet?"

"Aren't you more needed at home?"

"Women don't have enough strength to do this kind of work."

"You'll hurt yourself and you won't be able to have babies."

"Women don't have the spatial aptitude needed for this work."

"You'll just be distracting my men; they'll be looking at you all day long."

Confronting these assumptions must be at the base of any training program which hopes to help women gain entrance into the trades. The confrontations must deal not only with what's "out there," but also with the unspoken fears and inner self-esteem issues of the woman about to enter the trades.

What are her responses to those questions?

How deeply does she believe in her own response?

Can she hold on to that belief in the face of harassment and loneliness?

Has she support among family and friends to help offset the early possible sense of isolation?

What inner strengths and external support group systems does she need to learn to draw on for perseverance?

In order to succeed in the end, in a personal way for each woman, the content as well as the style of training must offer a strong response to societal conditioning. Exercises which help a woman begin to look inward at her own assumptions form a good starting point. Throughout this process, individual support and positive feedback will be essential.

The need for pre-apprenticeship training programs, run by and for women can easily be seen, for until the 1970's, young women in secondary schools were often not even allowed to take shop or mechanics classes, and were discouraged from taking advanced math or physics classes.

Even though such classes are now open to young women (although not entirely without costs of stigma or harassment by classmates or relatives), there is more than just some "lost time" to be made up in our training programs for the skilled trades. Women in American society, as a whole, are not encouraged to set separate goals for themselves. They are taught to pay more attention to the type of husband they should seek or how many children they should plan to have. Career women are still, for the most part, seen as superwomen who defy real parameters of possibility for the female gender.

To further complicate matters, women in this society are by and large not conditioned to take themselves seriously. It is possible to see among young women some effects of recent changes in this area of psychological growth, but not so for most women in their late twenties and thirties. A comprehensive training program must help the women begin to see their "rights" and assist them in perceiving the validity and promise of the career change they are considering.

*****

The training being done throughout the country in this field needs to be innovative in its approach and optimistic toward what it seeks to accomplish. That optimism needs to spread to each and every participant in the program if she is to gain a full sense of what she deserves, what she can do, and what career vistas are open to her.

Thus it is clear that empowerment must be an underlying principle of any training of this type. The instructors must be, above all, respectful of the women and the career transitions they are considering. Encouragement should be given often: the women should feel comfortable to ask questions, explore new options, try new tools or take new risks. Along with these concepts, the student is fundamentally encouraged to take responsibility for herself, which is empowering in and of itself.

A course of this type, giving the trainees exposure to many trades and an opportunity to meet many different tradeswomen, offers a multitude of role models. Positive feedback comes forth from all Hands-on teachers as well as the general instructor to effect an atmosphere in which women feel willing to try. Mistakes are used as a learning experience, and are never interpreted as failures.

At the same time, women are strongly encouraged to attempt new challenges and to take a positive attitude toward those tasks. A woman saying "I can't do it" is asked to rephrase her sentence, take a more positive approach with "I can do it!" Problem solving is taught throughout the course in a way which helps women take a team approach and see their collective as well as individual strengths.

After all, the challenge of opening up non-traditional careers to women is a task which will take a multitude of approaches, both individual and collective. A woman will persevere all the longer

in her field if she sees not just her own individual job and its conditions, but rather the condition of women everywhere and her place in the struggle for improvement and empowerment.

SECTION I. NETWORKING EXERCISES

In the early weeks of the course, special emphasis is given to the development of the friendships, network, and support groups that can eventually be critical in sustaining the individual woman in a male-dominated workplace.

Each student is strongly encouraged to meet and get to know each of her classmates, not just those who seem most like her, or most interesting to her. In this way, students will come to share with and learn from each other. The hope is that the class will bond as a unit, and those women completing the course will continue on their own to meet for such purposes as ongoing study sessions, consciousness-raising sessions, and support group meetings.

Over the years, it has been seen that women entering the trades in the 1970s and 1980s managed best if they had solid support groups and good friends to call on after a particularly hard day. It is the women with good support networks that are best able to sustain themselves in the construction atmosphere, and they are the ones who to this day continue to work and grow in the skilled trades.

> Having a network of tradeswomen is...invaluable. Any woman involved in a trade or occupation where she is isolated can benefit from the camaraderie and strength of networking with other women in her field.
>
> —Nina Saltman
> Hard-Hatted Women

The following exercises have proved helpful to groups of students who are forming an ongoing support network. They are not lesson plans, per se, but rather suggest a style of teaching which helps the class see itself as a built-in resource of strength and support.

First night goal sharing: Women are asked to share three life goals (not necessarily related to the trades) that they hope to accomplish.

Introducing Each Other: Several other sessions (especially Saturday Hands-On sessions in a larger room) begin with a five minute time period where women pair up, preferably with someone they do not know or do not know well. During the time period, the two women interview each other knowing that they will then introduce each other to the large group when it reconvenes. The result of this exercise is that, over several weeks, a gradual process occurs through which the women in the class really do come to meet their classmates and see what they have in common. Women ask each other about their current jobs and future career goals, numbers and names of children, where they grew up, where they live now, what they've studied or trained for, and similar questions. They then "introduce" their partner to the larger group, sharing as much detail as they can recall.

Quick Name Introductions: To help everyone get better at learning each others' names during the early weeks (class sizes have ranged from 20 to 40 women), a simple exercise is used during stretching out at the beginning of Saturday sessions in which a woman introduces both a new physical stretch (neck rotations, for instance) and the name of someone in the group who has not yet been introduced and something she has come to know about that person.

Applause/Congratulations: The class is encouraged to support one another after difficult tasks with applause or positive comments. A woman afraid of heights may be verbally encouraged while climbing a scaffold system or a woman struggling with math anxiety may get a big round of applause after coming up with a correct answer.

Cooperative Learning Groups: Many of the skills critical to the trades are best practiced in small groupings of twos or threes. Measurement is an example of this. It is necessary not only to be able to read the tape measure, but to read it accurately and with certainty and speed. By encouraging the idea that we ALL need lots of practice to do this correctly, the competitive approach is removed over time. Women work in smaller settings, measuring items back and forth, and checking one another's work. It is possible to have women who are strong in an area work together with one or two who require more practice, and over the course of the exercise period all participants become more proficient in the task at hand.

Attendance at Local Trade Organization Support Group Meeting: Further into the course, part of a class period is set aside to attend a local tradeswomen's support group meeting. This is a time for the class to listen and learn of the concerns of women currently working in the skilled trades. Through this event, they can gain insight into the importance of such support group meetings for their own sustenance and perseverance once they come to be working in the trade of their choice.

Exercise Time for Practice Work in Pairs: The Saturday Hands-on sessions also allow time before and after the trade specific presentation so that women may team up with a classmate (and or with instructors, as necessary) to have extra work time for practice in troublesome areas. Once again, the principles of cooperative learning come into play. Women tutor and work with each other on math problems, measurement of objects in the room, figuring areas and perimeters, doing estimates of work, reading blueprints, etc. During these exercise periods, classmates are getting to know each other better, forming the friendships that will be the basis of a strong support network.

Job Search: Class participants are encouraged to go together to make job or training applications if two or three students hold a particular trade interest in common. They work on application forms together after class, with instructor or counselor assistance as needed. Going to the job sight together to turn in their applications helps counter the frightening feelings that might come up, and gives the women an immediate place and partner with whom to process those feelings.

Class Building Project: Support and solidarity are further facilitated through planning and carrying out a group building or decorating project. For instance, building a simple room partition, painting an office space, or constructing storage shelves are past group projects which brought about a real sense of accomplishment in the class, as well as having helped the whole class bond around the task at hand. Instructors and trade specific presenters take pride in the work of the class as a whole.

SECTION II. SELF-ESTEEM EXERCISES

Lack of confidence is often the biggest hurdle a woman has to jump in order to feel comfortable applying for and performing in the macho world of the skilled trades. In an effort to lay a new foundation for personal confidence and self esteem, a number of esteem building techniques and exercises are used throughout the duration of the course. Some are described below and others spontaneously present themselves on occasion:

First Week Job Interviews: During the first week of classes, students team up in groups of three for roleplay exercises. Using a page of sample job interview questions, one woman interviews another for a job in the trade of her choice. The third woman observes silently during the interview, then gives feedback afterward. The members of each team rotate positions until everyone has done a full interview as Employer, Applicant, and Observer. If possible, segments of each woman's interview are recorded on video, to be reviewed at the end of the course.

Last Week Job Interviews: The same exercise is repeated in the final week of class, and often the growth of confidence will be dramatic. For one thing, each woman brings her "Job Readiness Kit" which helps her to present all the required documents (H.S. Diploma, Personal References, her past skill experiences) in a forceful, organized manner. Women are asked the same questions, and a few more, and once again the interviews are videotaped. The before/after interviews are then watched by the entire group on the last day of class or at graduation.

Personal Progress Charts: Grades are not emphasized in the course, however, each student is expected to make steady progress in relation to her own pre-test measurement. Homework and test materials are returned to the student emphasizing such progress and also what areas need more concentration. Students are encouraged to talk with classmates and instructors about why they think they did "well" or "poorly" on a particular exercise. They are asked to look back at past homework pages or tests (or physical conditioning progress charts) to gain perspective. Often, when that performance is measured against their starting point, they actually made more progress than then realized. Approaching subject matter this way builds self-esteem and confidence.

Non-comparison Progress: Along with the information above, women in the class are asked not to judge their own work by comparing it to that of someone else. It is important that a non-competitive atmosphere give the students a chance to develop their own self-esteem based firmly on individual performance and progress.

Interrupting Personal "Put-Downs": Students who say "I Can't" in regards to a task or problem are interrupted in this statement and encouraged to give themselves another, more positive message. Often if the problem is broken down into parts, it will turn out that they can do at least one of those parts. Affirmation is given for this, countering the "I Can't" or "I'm No Good" message in their mind. A further note is that any racist or sexist comments made during class time are interrupted as well. This contract is set up during the first week of class so that students know that these types of bias will be confronted directly.

Test Anxiety Affirmations: Test-taking skills are reviewed before every test, and the class is encouraged to call out some affirmations and to take a series of deep breaths together. Students are reminded of the importance of reading quickly through the test, then working some "easy" problems to get over test anxiety, then proceeding with all problems and rechecking one's work if time allows. Since many of the women in the program will go on to take entry exams at trade union offices, it is important to practice taking tests, focusing energy calmly on the tasks at hand, and staying focused until the end of the test. Timed tests are practiced as well.

Harassment Survival: During certain hands-on exercises, the class examines how a male-dominated work site might view a woman's fear or lack of confidence around a certain task. For instance, when climbing a high ladder or walking a balance beam, a woman might practice concentrating on an inner message of "I Can Do It" even in the face of her classmates roleplaying macho comments on her performance. This exercise is best done with several of the more confident students "climbing" or being the scapegoat first; then the class as a whole discussing the feelings that came up, how they countered the negative comments within themselves, and how they each think they would do in a similar situation on the jobsite. The exercise is ended by each woman compiling some individual affirmations that seem to work for her in such a tense situation.

Esteem Building Roleplays: Short roleplays are done before the group in which one person "hassles" another with familiar job-site criticisms. An example is: "You can't carry that; you're just a woman." The "Criticizer" goes around the room, repeating the sentence to each woman, who in turn responds as best she can. Humor is encouraged as it often relieves tension on the job, but each woman should speak from her heart in a way that helps her feel strong in the situation. Once around the room, the Criticism Sentence is changed and a new "Criticizer" takes over.

Interactions with Authority Roleplays: Similar to the above comments which are played out as if they come from co-workers, a separate series of roleplays is completed in which the speaker is the Foreman or Supervisor. The women must learn to respond directly to the criticism, recognizing the "roles" implied, and being respectful of the authority of the person raising the criticism. Throughout the exchange, she tries to maintain her own self-respect and self-esteem, while giving a response that will bring closure to the situation, and leaves communication clear at the end. This skill could prove to help a woman keep her job in a situation that involves a critical supervisor or foreman.

Taking a Deep Breath: In the activities listed above and other Confrontation Roleplays in which tension can easily build in the room, even though the action is a make-believe situation, period time-outs can be called. These can serve the purpose of allowing women to reflect on what they are feeling, and to come up with possible verbal responses and insight into inner strengths to get them through the situation. The class as a whole might be encouraged to, when needed, "Take a Deep Breath."

SECTION III. GOAL-SETTING EXERCISES

These exercises are worked into classroom assignments to assist each woman in choosing the correct career and determining life goals as related to that career. These exercises are begun about mid-way through the course, after at least five to six Trade Specific workshops have been held. Women should write up their answers, but can also work in small groups discussing these job-related issues. The following are question areas which have proved useful:

- Choose three trades of interest and state why they are preferences.

- List any life or skill experience that you feel relates to the three trades of choice. If you have no relevant experience, tell what makes you think you would like to work in the trade full-time.

- What were the sources of employment of adults in your family while growing up? What were their prevailing attitudes about work? Would you say that they took pride in their jobs?

- Did women in your family (mother, older sisters, aunts) work outside the home? What types of attitudes did you pick up about that?

- What types of jobs were you led to believe were possible to you as a woman? Recall any particular early childhood or grade school experiences that led to this belief.

- When you were younger, what did you expect to be doing as an adult? Have any of those expectations come true yet? Which expectations would you say you still hold today? If things are turning out differently, do you look on those differences as good or less than good?

- Do you have plans to have children during the first years of your apprenticeship? If you had to postpone having children during that period in order to concentrate on your training, how much of an issue would that postponement be?

- How much does your paid work/career reflect on your self-esteem? Pick five different things you did in the past week (i.e. helping a friend, buying new shoes, completing a task at work) and list them in order of priority of how good they made you feel about yourself.

- What are some things, besides money, that you expect from a job in the trades?

- List at least five ways in which you think about your work and whether it is worthwhile: i.e., what you produce and how necessary it is; the challenges on your jobsite; your relations with co-workers, and more.

- Now look back over the information compiled by the questions above and set two realistic goals, one job related and the other a personal choice, that you hope to accomplish in the next two years.

- As a practice session for realistic goal-setting, the class does an exercise during physical conditioning time that involves setting a goal of a certain number of "baskets" they can make on the basketball court. After a first try at achieving their set number of baskets, they then adjust the number until it becomes possible to reach it. The exercise takes about half an hour, and helps to bring about a more concrete understanding of the goal-setting process.

SECTION IV. LESSON PLAN: JOB SEARCH

Review with the entire class the structure of union halls, hiring halls, job representatives, and the various ways in which a person can be hired in the skilled trades. Women are encouraged to go in pairs or small groups to seek work at construction sites. Often parking is hard to find, and one woman can circle the area while the other goes to find the foreman. If an interview is granted, then they can switch places, and the driver can go in to seek work.

In the construction industry, one can sometimes be hired on the spot; thus, women should go dressed for work, taking along hand tools, hard hat, safety equipment, and a lunch. Being unprepared to stay for the day can potentially cost one a job. In addition to these items, they will be best prepared if they carry along their Job Readiness Kit and a survival notebook (both of these are described in upcoming sections) for recording important information or directions.

At times, the foreman will request that the woman return the next morning. This is often a type of test, but showing up early the following day may mean she will be given work at the site.

Additional information on jobs in the trades should include pay scale structures, health and insurance benefits, and similar pertinent information. It will often bring up questions about budget planning, what to wear, how to respond to questions on applications and so forth.

Class assignments:

- **Formulate a monthly budget plan. Students should compile personal information, then work together in class on this assignment.**
- **Create a savings plan based on first-year apprentice wages. It will be important to have such a plan, especially if one's work is conditional on fair weather.**
- **Acquire safety equipment, boots, and clothing suitable for work in the trade of your choice. This can be done over time, but a plan can be begun which will add an item or two of clothing each month.**
- **Begin to research construction companies you may want to work for. Find someone who has worked for them. Seek out companies that tend to hire more women and minorities. Do "homework" to find the employer that is best for your needs.**
- **Prepare your own questions for the interview process. These might include information on the pay periods, the company benefits, any health risks, tuition scholarships for dependents, or how soon the job will be available.**
- **In front of a mirror, at home, rehearse some of your responses to often-asked questions. Concentrate on not fidgeting, looking into the questioner's eyes, communicating enthusiasm and confidence for the work.**
- **During roleplay interviews in class concentrate on the above points. In addition, practice projecting your voice in such a way that you can be heard.**

SECTION V. LESSON PLAN: APPRENTICESHIP INFORMATION CENTER

During the first week of class, after the structure of unions and the apprenticeship process have been presented, the class is visited by a representative of the Apprenticeship Information Center (AIC).

The presentation explains the advantages to be gained by going to the AIC office to register one's interest in three trade choices. A woman must choose three initial trades in which to claim interest, as well as three counties of Illinois in which she is willing to work. This information is then added to AIC's computer system, and the applicant begins to receive in the mail notification of any openings for apprenticeship training (or entrance tests) in the three trade interest areas that she has listed.

Class participants are also given detailed information on various individual training programs through a question and answer period on that same evening. By the end of the night, they have a fairly good working knowledge of the process for entry into the trades. The discussion gives them the specifics of what will be expected of them in the initial application processes (High School Diploma or G.E.D., Birth Certificate, etc.). The night's discussion covers many essential understandings regarding working in the trades. The importance of having a vehicle, of being on time, of wearing safety equipment, and of being alert and on the job every day are just some of the principles mentioned.

SECTION VI. LESSON PLAN: MAP READING

In Chicago, a major roadblock to that first interview is finding the jobsite, a place to park, the person in charge or the Personnel Office, and doing all of the above on time. Women are encouraged to practice getting to the test site or an important job interview before they have to actually go there.

Classes have repeatedly requested a map-reading lesson, in which the following resources are reviewed in detail.

Resource Exercises:

- **A Detailed Metropolitan map showing city and suburbs. Students work in small teams with a map and are asked to locate certain areas, especially those containing industrial complexes or current construction projects.**

- **The Yellow Pages. Special attention is given to how this book is organized, the importance of calling for appointments, and what information to record (the person you spoke with, etc.) In addition, the center section is studied since it contains CTA maps, zip codes, and especially street locations (what hundred east, west, north or south) on the grid for all city streets. Also in this book are detailed Transit Authority maps and the CTA number for route connections by public transportation.**

- **Expressway map. This map shows interconnections between highways. It is important to point out symbols for tollways and fee areas (i.e. Chicago Skyway).**

SECTION VII. LESSON PLAN: LEGAL RIGHTS PRESENTATION

One support group session is scheduled for a lengthly presentation by a local attorney to review the law as it pertains to interviews and working conditions. Harassment, in various forms, is given particular attention.

The attorney typically begins by covering what to watch for when applying for a job, how to answer questions, what types of questions asked by the employer deserve a mental note and to be recorded after the interview, and what to notice in terms of present employees.

The lawyer next explores various types of on-the-job situations which could be illegal and the best strategies for handling them. Treatment by supervisors, co-workers, sub-contractors, and so forth are examined. To make the presentation more lifelike, students are asked to roleplay certain scenarios, and then the class processes how the situation might be handled.

The roleplays and the discussion help the class gain a clear sense of their legal rights, fair and equitable employer-employee relationships, and the legal rulings which protect them from discrimination and unjust treatment.

In addition, the laws regarding sexual harassment, sexual advancement, and conditions on the job are reviewed. Pornography on the worksite and requirements regarding bathroom facilities are discussed. Students are encouraged to keep a journal of conditions on the job, as well as treatment by any troublesome co-workers.

The importance of keeping such a job journal is stressed throughout the discussion. The woman should begin it at the first phone interview with a prospective employer and continue through her career with that employer. When to make notations, what to record, what not to record, and how the journal may be used in a courtroom presentation are all part of the material covered in the lecture and discussion.

Journals, their use and importance, as well as how to develop good journal-writing skills, are coming to be so critical to working in the trades that this manual devotes the additional two sections to further information on journal writing.

SECTION VIII. SURVIVAL SKILLS NOTEBOOK

A primary goal of the training program is to help each woman become as prepared as possible not only to enter but, more importantly, to persevere in the trade of her choice. Toward this goal, students work to develop several notebooks of information which may prove critical during their career transition and later on in the field.
The journal writing activities described in this and the following section are practice exercises which address the objective of preparing each woman to keep notes on her interviews and interactions, in the hope that such record-keeping will serve as her own personal Survival Kit for work in the skilled trades. The notebook may be used in very simple, straightforward ways, such as a reminder of safety equipment she needs to take with her to the job. She might record tool care or certain procedures to follow in doing a certain installation. On the other hand, the journal could come to be an important record of interactions on a jobsite where she desperately hopes, in spite of harassment, to hold on to her job.

SECTION IX. JOURNAL WRITING

Women entering the skilled trades and male-dominated work sites must be prepared for the possibility of finding discrimination, isolation, and/or sexual harassment in its many forms. Women are encouraged from the Orientation Day on to keep a journal of interactions relevant to their career change and job search. Such record-keeping assignments form the habits needed later on in the field, when what seems like an innocent enough comment can lead to a series of harassments, verbal and otherwise.

By learning to be alert to early danger signals, be they from co-workers or supervisors, a tradeswoman can record instances in a manner that can hold up as evidence in hearings. In the end, these records can often save her job and her reputation, and win promotions and respect. As the construction world becomes more aware of this simple self-defense skill being utilized by more and more women in the trades, the impetus for real change will be radically affected.

Journal Writing Sample Assignments:

These assignments are given at various points during the class for homework or at the end of a class period. The purpose is to help the women gain skills in quickly and accurately recording various types of interchange. These assignments are collected and read by the instructor, and then reviewed individually with the student. The following are sample assignments and not all of them are assigned during any one training sequence.

Class assignments:

- Write a paragraph recording a short conversation with an adult male person: your husband, a friend, or someone at work. Use direct quotes where possible. This exercise is graded for clarity, punctuation, and correct use of quotation marks.

- Record in your journal some item learned during the evening's class which you want to recall later. This assignment is given at the end of class. The section of writing is evaluated for clarity, and it also communicates the degree of learning taking place.

- Summarize what you have learned so far about the Sex Equity laws and guidelines related to construction jobsites.

- After a job interview, record the questions asked of you. Note especially questions (implied or expressed) having to do with marital status, and whether you have children or plan to have children.

- After a legal presentation touching on the following pieces of legislation, write in note form the information that you would like to be able to have in your notebook for easy referral:

Resources Regarding Regulation of Discrimination at the Worksite:

Title VII — Civil Rights Act
Equal Employment Opportunity Act
State Anti-Discrimination Laws
Affirmative action legislation.

SECTION X. JOB READINESS KIT

Along with the cultivation of recording and writing skills is a special assignment given on the first night to run the length of the course. This task is the creation of the woman's own Job Readiness Kit which she will take on job interviews, and in which she will record information she deems important at each new job placement.

For job interviewing, the Kit should include the following:

1. The woman's High School Diploma or G.E.D. Certificate.

2. Her Birth Certificate, original.

3. Original and an extra copy of her Social Security card.

2. Her doctor's letter of good health. If a letter is not given to her after her physical exam, she should still include in her notebook the name, address and phone number of the doctor who examined her.

3. Three personal references, including current addresses, zip codes, phone numbers, and the relationship of these persons to her. As part of her preparation for job search, she should also contact those persons to ask permission to list them as referrals.

4. Past job experience, beginning with the most recent job and going all the way back to when last in school. Again, complete addresses and phone numbers should be included, dates should be rechecked, and the name of a person at the place of employment should be included as a reference.

5. Her driver's license number and its classification.

6. A list of skills she feels she has (being realistic about actually having some experience in each of these areas).

7. A list of achievements, involvements, and hobbies. This could include groups with which she works, church or school committees, or any activities which would convey her energy level and commitment.

8. In addition, the survival kit should include two other notebook sections:

8a. A section of blank pages on which to record information regarding the job which she obtains during the interview or any orientation process. This section could also include directions to the site, the location of entryway, any special safety equipment required, and so forth. She can use this blank writing space to note questions which might come up for her during the interview.

8b. A second section for recording personal interactions after the interview. She could use this notebook as her "Journal," recording any conversation that was either very positive or perhaps brought up questions regarding discrimination or harassment. As much as possible, these interactions, especially the latter,

should be recorded verbatim. If this is not possible since the woman will be recording them after the incident, she should note their content as fully as she can, and also note whether there were any witnesses.

9. In another part of this notebook, the woman might include some personal sources of strength or some favorite responses to possible tense job situations.

Under the last section, a woman may choose to place a picture of her child, a prayer, an affirmation, or some words of encouragement from a friend under the source of strength section. This one page might prove to be her source of determination in a particularly intimidating situation.

In the same section, she might want to record typical male comments which come up on job sites, even when a woman first interviews. She may have thought of a particular "comeback" that she likes, or a joke or story that exemplifies the fact that women can do "men's" work. Perhaps she can reuse a good response that she heard or read somewhere and wants to keep it close at hand.

> A tradeswoman, teaching a bricklaying trade specific session, recently told a class how she handles sexual advances or "date requests" on the jobsite. "I can't cook to save my soul," she said, "and furthermore, I have eight kids at home that go where I go. So now, whatever are you asking me for?"

More humorous than her comment was the sight of the journal notebooks flying open as the students hurried to record her statement.

THE LESSON PLANS

MATHEMATICS

Mathematics is indispensable to working in the trades, and entrance exams to union apprenticeship programs typically cover all basic math operations up to and including some basic algebra and trigonometry. In an effort to help women pass these tests and continue through their apprenticeship with a firm groundwork on which to build more math skills, the CWIT training allocates one full hour of every class to math lessons.

Through cooperative learning groups, math can be presented and worked on in an amicable and relaxed setting, removing a fair amount of the anxiety and stress typically associated with it. These groups also tend toward immediate rewards and confidence-building among the women as they work out problems together.

The course of study is a general refresher which then incorporates new math skills related specifically to the trades. This approach helps women feel capable of thinking in mathematical terms, working word and other practical application problems, and knowing how to approach multiple-step problems. Problem solving is taught as both an individual and a group process.

The confidence gained in this one area seems to act as a mortar for other aspects of the course. Students assess their progress in the overall course with a heavy emphasis on how they do in the area of math, and without a doubt, apprenticeship programs will do the same through the first year.

MATH LESSONS begin with a very basic review, which is outlined below. Lessons progress through grade school math, then secondary school math. Often a short quiz reviews the material from prior class sessions to help students build an ongoing repertoire of math skills. The level of math skill to which the course aspires is a high degree of ability with any math problem up to and including senior level of high school. Algebra is covered in the final weeks and those lesson plans can be found later in this guide. Most of the lessons in the math sequence require two or more class periods for presentation and practice, after which a test is given to measure skill level progression.

It should be noted that the textbook used under the following lesson plans is Robert Smith's Applied General Mathematics. New copies of that book are no longer available, and classes are currently working with a series of workbooks published by Contemporary Books, Inc., Chicago. As these are self-guided workbooks, the students may advance at their own pace.

The lesson plan delineated remains the same beginning with Number Power 1 for whole number operations, Number Power 2 for fractions, decimals, and percents, and Number Power 3 for Algebra work. Robert Smith's textbook is still being used in the tutoring segment of the program.

SECTION I: WHOLE NUMBERS

Objectives:
By the end of this unit, the student will be able to:

- Read and write small and large whole numbers
- Arrange and add whole numbers
- Arrange and subtract whole numbers
- Arrange and multiply whole numbers
- Arrange and divide whole numbers
- Apply the use of whole numbers to skilled trades problems
- Solve problems by combining operations of addition, subtraction, multiplication, and division

Materials:
Smith, Robert. (1982). Applied General Mathematics. Albany, NY: Delmar Publishers, Inc. Review of Chapters One through Five.

Class presentation:
Cover in sequence first five units of text, teaching and giving special emphasis to:

Place values
Procedure for aligning and adding numbers
Dimension Lines
Procedure for aligning and subtracting numbers
Borrowing in detail, with much practice
Subtraction problems containing zeros
Procedure for short multiplication
Location of multiplication table and need to memorize the table
Procedure for long multiplication
Multiplication with zero in the multiplier
Multiplying three or more factors
Procedure for dividing whole numbers
Zero as a dividend; zero as a divisor

Homework Assignment:
Choose ten problems to do in each unit review for further practice. Those needing more practice will be tutored prior to the next class period, and assigned further practice until they achieve proficiency in the area.

SECTION II. ORDER OF OPERATIONS

Objectives:
By the end of this unit, the student will be able to:

- Perform combined operation problems involving several steps
- Apply the proper order of operations in a problem
- Solve problems using formulas by applying the proper order of operations

Materials:
Unit Six of Applied General Mathematics text.

Class Presentation:

Order of Operations
Concept of powers, and working with exponents first
Concept of grouping symbols, brackets, braces, parentheses
Importance of performing operations within any symbols second
Next removing brackets through the designated operation
Doing any multiplication or division from left to right
Last, doing addition and subtraction from left to right
Nmemonic device with which to remember the above sequence:
Please Pity My Days At School (Powers, Parentheses, Multiplication, Division, Addition, Subtraction).

Homework Assignment:
Work entire Unit 6 Review, Exercise 6-1 and to further solve 4 word problems that apply to student's trade area.

SECTION III. COMMON FRACTIONS

Objectives:
By the end of this unit, the student will be able to:

- Understand fractional divisions of an object
- See connection between fractional parts and parts of an inch
- Express fractions as equivalent fractions
- Reduce fractions to their lowest terms
- Recognize improper fractions
- Express mixed numbers as fractions
- Determine lowest common denominators
- Add fractions and mixed numbers
- Subtract fractions from other fractions
- Subtract fractions and mixed numbers from whole numbers
- Multiply fractions, including problems with 3 or more factors
- Multiply combinations of fractions, mixed and whole numbers
- Divide one fraction by another fraction, by inverting
- Divide combinations of fractions, mixed and whole numbers
- Do cancellations to reduce in multiplication and division
- Express answers in lowest terms

Materials:
Math book, Units 7 through 11. Ruler or tape measure, as introduction to fractions is combined with presentation of fractional divisions of an inch. Equivalent fractions are demonstrated on the ruler as well, (i.e., two quarter-inches equal one half-inch, etc.)

Class presentation:
This section of study takes two or more weeks of math classes, along with further review at end of course. After general concepts and tape measure are introduced, the material is best broken into several classes on addition and subtraction, followed by a class or two on multiplication and division.

The following tasks are taught in detail, and accuracy is emphasized in:

Recognizing fractional parts of a whole
Seeing a fraction as an indicated division
Determining equivalent fractions
Dividing by the number 1
Expressing fractions in lowest terms as correct answer
Expressing mixed numbers as fractions
Converting fractions to mixed number for final answer
Finding lowest common denominators
Factoring, recognizing prime factors
Adding and subtracting fractions from fractions
Subtracting fractions and mixed numbers from whole numbers
Subtracting fractions and mixed numbers from mixed numbers
Multiplying fractions
Multiplying combinations of fractions, mixed and whole numbers
Cancelling; dividing by common factors
Dividing fractions; process of inverting the divisor
Dividing combinations of fractions, mixed, and whole numbers

Homework Assignments after Each Class:
Choose ten problems in each unit review for further practice. Do several word problems of interest after each unit.

SECTION IV. COMBINED OPERATIONS WITH COMMON FRACTIONS

Objectives:
By the end of this unit, the student will be able to:

- Solve math problems involving a series of steps.
- Apply the proper order of operations learned in Section II to problems involving fractions and mixed numbers.
- Solve practical word problems found in the skilled trades which involve use of whole numbers, mixed numbers, and fractions.

Materials:
Math book, Unit 12.

Class presentation:
Special emphasis is given to the following items, enabling the student to:

Recognize fractional symbols as brackets within a problem
Do work within parentheses or fractional expression first

First, work within innermost parentheses when more than one set of symbols exist in a problem
Second, work from left to right, doing multiplication and division (getting rid of brackets)
Lastly, do addition and subtraction in order from left to right
Work multi-part practical application problems as they exist in the skilled trades

Homework:
Do Unit review, all problems, Exercise 12-1. In addition, choose 4 problems of interest to do from Word Problem section.

SECTION V: DECIMALS

Objectives:
By the end of this unit, the student will be able to:

- Make connection between fractional parts of a whole and decimal parts of a whole
- Round off decimals to any indicated number of places
- Express common fractions as decimals
- Express decimals as common fractions
- Align decimals and add problems involving decimals
- Align decimals and subtract problems involving decimals
- Multiply decimals and correctly place decimal in answer
- Divide decimals, with correct placement of decimal point

Materials:
Math book, Units 13 through 17.

Class Presentation:
Cover in Sequence the units 13 through 17, giving special emphasis to enabling the student to:

See the meaning of fractional parts, regardless of expression
Read decimals
Round off decimals to a designated place
Express common fractions as decimals
Express decimals as common fractions
Move back and forth easily between fractions and decimals
Do addition and subtraction of numbers involving decimals
Multiply decimals and know where to place decimal point
Multiply by powers of 10
Divide decimals and know where to place decimal point
Divide by powers of 10
Do combined operations with decimal problems
Work practical application problems relating to their trade

Homework:
Work five problems of each type at each Unit Review, and then solve two word problems of interest in the Practical Application section.

SECTION VI. EXPONENTS AND SQUARE ROOTS

Objectives:
By the end of this unit, the student will be able to:

- Recognize exponential symbols and the radical sign
- Raise numbers to indicated powers
- Know common square root multiples
- Solve practical problems involving powers and roots
- See where square roots are used in the skilled trades
- Find square roots in problems using the Pythagorean Theorem

Materials:
Math book, Units 18 and 19.

Class Presentation:
Teach the following, giving special attention to enabling the student to:

Know the meaning of powers, and recognize exponents
Recognize the radical sign, and know its meaning
Combine root operations with other math operations
Compute combined operations with decimal fractions, including those involving square roots and powers

Homework:
Solve problems in each Unit Review section, including two problems from the Practical Application section.

SECTION VII. PERCENTAGE PROBLEMS IN THE TRADES

Objectives:
By the end of this unit, the student will be able to:

- Express decimal fractions and common fractions as percents
- Express percents as decimal fractions
- Determine the percentage, given the base and rate
- Find the base, given the rate and percentage
- Find the rate, given the percentage and base

Materials:
Math book, Units 20 and 21.

Class Presentation:
Teach the following, enabling the student to be able to work with percentages in the following ways:

Recognize the percent sign symbol and understand its meaning
Know how to recognize the base in a word problem
Know how to recognize percentage and rate in problems
Work the pie formula for Percentage = Base x Rate
Express decimals as percents
Express common fractions and mixed numbers as percents
Express percents as both fractions and decimals
Solve a problem for either its base, percentage or rate
Work problems that students may have regarding pay raises, discounts, loans or interest on their savings

Homework:
Work a selection of problems in both chapters until the concepts in percent problems are fully grasped.

MEASUREMENT AND GEOMETRY

As measurement is used to some extent in all of the skilled trades, it must be given a clear and thorough presentation early in the course. Further review lessons are often necessary in the second and third week, after which students have enough basis to practice together until proficiency is achieved.

It is impossible to work in most trades without being able to read a tape measure to the sixteenth of an inch. Some students, who begin with a firm understanding, work toward being able to read to the thirty-secondth of an inch. Students work individually and in pairs, helping one another advance in understanding of all marks on the tape measure and develop speed in reading the ruler. Knowledge of the tape measure should be firmly established before completion of the course.

Measurement continues to be practiced as the course content moves into Plane Geometry and then into square and cubic measurement. As each new formula is introduced, students practice with real objects (sometimes rooms and hallways) to work each formula based on a real setting. This is how the knowledge would be applied in the trades and it is of key importance that students make the connection and come to see how formulas would be used in the workplace.

SECTION I. LINEAR MEASUREMENT

Objectives:
By the end of this unit of study, the student will be able to:

- Readily recognize the different length lines of division on a ruler or tape measure
- Read a ruler to within 1/16th of an inch
- Draw a line to an assigned length to within 1/16th of an inch

- Understand divisions up to 32nds of an inch
- Know that for three dimensional objects, it is important to measure for length, width, and thickness (or depth)

Materials:
Each student has her ruler for practice. Additional 25- and 30-foot tape measures are available. Pieces of wood, metal, and laminate in varying sizes for practice measurement are also supplied.

Class Presentation:

An enlarged one inch segment is drawn on the board for study
A large circle or object is drawn and then cut in half
Object and inch line are both segmented
The length of the half inch line is studied first
The half inches are divided into quarters
The quarter lines are further divided into eighths
Lastly, the sixteenth lines are added and studied
Location of 32nd marks is described, and an example shown
Attention is given to the lengths of each dividing line
Demonstrate how to quickly recognize the half-inch mark and use it as a guide for smaller marks located near it
Show correlation between reducing fractions to lowest terms and the name of each line between any two inch marks
Do practice measurements
Over a two week period, review the above, having students call out the name of each dividing line
Have students measure objects in the room, textbooks, etc.

Homework:
Measure five objects, giving length, width, and depth. Additional worksheets are supplied to those requiring extra practice.

SECTION II. PERIMETER AND AREA

Objectives:
By the end of this unit, the student will be able to:

- Distinguish between perimeter and area
- Know the formulas for finding perimeters and areas of squares and rectangles
- Be able to take assignments to measure room dimensions and then calculate for perimeter of floor/ceiling area
- Be able to use formulas for a missing length or width when given the area.
- Be able to take more complex figures and calculate missing measurements before figuring length or area
- Explain the difference between linear and square measurement
- Label answers correctly as to square or linear feet, inches, etc.
- Give examples of why one would calculate perimeter in building
- Give examples of where one would need to figure area
- Explain square footage

Materials:
The classroom itself is used in an exercise of measuring walls, floor and ceiling area. Individual walls are used in calculations of baseboard needed, casings around doors and windows, amount of paint needed, and similar exercises.

Class Presentation:

Describe perimeter. Ask first to see who remembers it
Solicit examples of where perimeter is used: fences, baseboard
Show formulas for perimeters of squares and rectangles
Work samples on board; have students work examples
Describe area. Ask for examples of where it is used
Show section of floor to describe square feet, vinyl tile
Give formulas for finding areas of squares and rectangles
Work samples on board. Have students work examples
Show a parallelogram. Superimpose a rectangle over it
Illustrate how the same formula would be used to find area of a parallelogram as for a rectangle, and why
Do some sample problems

Homework:
At home, measure three rooms, list their length and width to the next foot (round up to the nearest foot), and then calculate the perimeter and area for each of those rooms.

SECTION III. TRIANGLES

Objectives:
By the end of this unit, the student will be able to:

- Recognize right triangles and understand 90 degree angles
- See that right triangles take up half the area of a rectangle of the same width and length
- Be able to see base and altitude as measurements in a triangle
- Know the formula for finding the area of a triangle
- Be able to work problems relating to the trades involving triangular surfaces

Materials:
Sample problems only.

Class Presentation:
Show a circle, describe degrees, show 360 degrees in a circle
Divide circle in half, show 180 degrees in semi-circle
Further divide into fourths, show concept of 90 degrees
Take one quarter and superimpose a triangle. Show right angle
Describe terms in triangles, base, altitude, hypotenuse
Give formula for area of a triangle. Work sample problems
Show triangle outlined within a square or rectangle to illustrate that it takes up one half of the area
Have students work sample problems on board
Give examples in which triangular shapes would be figured at worksite and have class figure for area or perimeter when the sides are given

Homework:
Work additional problems involving the areas of triangles.

SECTION IV. VOLUME

Objectives:
By the end of this unit, the student will be able to:

- Describe the concept of volume in a square or rectangular room
- Give the formula for finding volume
- Relate examples of where one might need to calculate volume
- Calculate the volume for the classroom and solve other sample problems

Materials:
Sample objects on which to calculate volume.

Class Presentation:
Solicit from the group the meaning of volume
Solicit examples and descriptions, volumes of air, storage
Give formula and work sample problems
Have students work problems for the group

Homework:
Do a selection of word problems from trade related examples, involving perimeter, area, and volume of rooms and buildings.

SECTION V. FORMULAS INVOLVING CIRCLES

Objectives:
By the end of this unit, the student will be able to:

- Draw a circle and label its radius, diameter, circumference
- See the connection between the perimeter of objects and the circumference of a circle
- Know the formula for finding radius from diameter and vice versa
- Know the formula for finding the circumference of a circle
- Recognize the meaning of an area of a circle, and know the formula
- Give the value for pi and explain its usage in the formulas
- Work problems involving circles, solving for various parts
- Find the area of a semi-circle, after finding the full circle area
- Understand volume of a cylinder as an extension of the concepts of volume in rectangular solids
- Know how to use the formula for finding the volume of a cylinder

Materials:
A pencil with a string attached to illustrate one way to do a large circular layout. A compass for drawing smaller circles. Sample problems.

Class Presentation:

Draw a circle on the board and define the terms radius and diameter
Show the circumference of a circle as a border or perimeter
Give the formula for finding the circumference of a circle
Define pi as a constant in the formula, giving a ratio of circumference to diameter, no matter the size of circle
Work problems involving both expressions of pi. Show how answers are slightly different since pi is an infinite, non-repeating decimal, which is rounded off to 3.1416 or 22/7ths

---

Give the formula for the area of circle and work samples
Use a pencil and string to design a round room or house
Measure off a radius and compute the area for that room or house
Have students solve problems for the group

Show the formula for finding cylindrical volume
Relate circles to boxes, to see height as a third factor
Work problems using the formula to find the volume of cylinders

Homework:

Do assigned problems involving circumference and area of circles.

SECTION VI. USE OF THE PYTHAGOREAN THEOREM

This formula and its use are taught along with the Math Lessons in MATH SECTION VI on Square Roots. It gives practical use to the study of square roots, and shows how this information is critical in the trades.

Objectives:

By the end of this unit, the student will be able to:

- Recognize the Pythagorean theorem and use its formulas
- Find the hypotenuse in a right triangle, given its sides
- Find an ungiven side in a right triangle, given its hypotenuse and other side
- Be able to list calculations in which the above information would be used, such as rafter lengths or stairs
- Use the principle of the 3-4-5 Right Triangle in doing square corner layout, or checking to see if an object is square to itself
- Be able to apply the term "Pulling Diagonals" and relate the principles involved to the concepts involving right triangles

Materials:

Tape measures, a carpenter's square, or drywall square. Also, a large wooden frame or small piece of furniture (bookcase) that can be pushed out of square.

Class Presentation:

Present a triangle on the board, review definitions
Review concepts of angles covered earlier, point out the right angle
Have students point out the hypotenuse

Give the formula for finding the hypotenuse of a right triangle
Work several examples, incorporating square root knowledge
Have students solve problems
Work with the same formula for a different unknown side
Work a fair number of problems until information is clear
In a hands-on session, use tape measures to see if classroom is square to itself, using 3- 4-5 Layout
Show formula again, proving that hypotenuse must be 5' if sides are 3' and 4'
Do a different corner of room, using multiples of 3-4-5, perhaps 9-12-15, if room is large enough
Show formula again, using two of those length to find the third
Pull diagonals on a square object to illustrate concept
Recheck corner of object with a square. Do 3-4-5 again
At end, show how large walls or decks would be squared by pulling diagonals
Discuss ways to hold them square
Explain use of braces, and 1-by furring materials

SECTION VII. ANGLES

Objectives:
By the end of this unit, the student will be able to:

- Tell how many degrees are in a circle, semi-circle, right angle
- Recognize adjacent angles and opposite angles
- Utilize known information and givens in angular figure to solve for unknowns
- Describe the meaning of perpendicular and horizontal, and what it means to bisect an angle

Materials:
Sample problems.

Class Presentation:
Review information introduced under Circles Unit regarding the number of degrees in circles, semi-circles and right angles
Further bisect right angle and calculate its degrees
Describe adjacent and opposite angles
Solve problems involving parallel lines and bisection of angles. Have students work problems for the group

Homework:
Do further problems with angles until concepts are clear.

SECTION VIII. MATERIAL ESTIMATION

This unit is woven into the lesson plans for mathematics, measurement and geometry, algebra, and blueprint sections. Each class presentation takes the class closer to being able to combine information to solve more complex problems, interpret drawings and word problems, and put to practical use the information gained in the course.

Objectives:
Under each component, the objectives are to enable the student to:

- See how the information relates to the trades
- Know where and when to use a particular formula or math operation
- Be able to calculate problems with hidden information and problems involving more than one step
- Be able to express an answer with a proper label: inches, dollars, square feet, cubic yards
- Identify and explain variables in formulas, and fill in the proper value
- Take measurements, work a formula, solve for square footage or perimeter, and figure costs or amounts of material needed
- Work word problems relating to the skilled trades

Materials:
Related to the subject matter at hand, class may take measurements of classroom walls, blueprints, or small objects. In addition an assortment of word problems from various textbooks may be presented.

Class presentation:
As noted above, this theme is woven into nearly every class session, but in any problem, the following steps must be taken:

Identify what is being asked for in the problem
Identify what information is given
Find any missing lengths or widths to fill in missing information
Choose the formula needed
Adjust that formula through algebraic transfers to use it to solve for the unknown
Do mathematics operations
Label the answer, as to feet, inches, yards, etc.
Look back to see that this is what was being asked for in the problem
Recheck mathematics

Homework:
Throughout all lessons, word or practical application problems are assigned for further practice.

ALGEBRA AND UTILIZATION OF FORMULAS

This unit of study is covered in the final three weeks of the course, during the math time slot of each class period. By this time, the class as a whole should be familiar with most math operations, enabling the algebra presentations to concentrate on the rules of working with signed numbers and working with variables in equations.

The information in this unit is constantly linked back to formulas learned during geometry classes to further build upon that earlier understanding.

The rationale for introducing algebra is twofold. First, it is used in a number of trades, especially by electricians, and the general principles of solving for unknowns are used when applying formulas for many types of problems. Secondly, the students tend to see it as an exciting challenge, a real energy boost near the end of the course. Many women have done little or no algebra work in school, and so for most of the them, it represents brand new and exciting material.

Taken in small steps, the women work with algebraic rules at their side until the knowledge becomes more integrated with their math skills. Both individual and group work is done, and a number of problems involving practical application of algebra are introduced so that students may see how it would be used in the trades.

SECTION I. SIGNED NUMBERS

Objectives:
By the end of this unit, the student will be able to:

- Know that every number has a sign and state that sign
- Know how to work rules for combining signed numbers
- Be able to multiply and divide and assign the correct sign
- Use correct order of operations in multiple step problems containing signed numbers

Materials:
Algebra: Rules of Combinations page, and Algebra Worksheets, Number Power 3: Algebra Workbooks.

Class Presentation:

Explain that every number has a sign
Explain understood positive signs
Talk about continuum of + and -, giving a checkbook with a debit as an example
Begin to present rules of combination: adding like signed numbers and adding unlike signed numbers
Move into subtraction rules of combination for like signed numbers and unlike signed numbers
Work many examples of both types of problems
Present rules for multiplication and division of signed numbers
Do sample problems
Review order of operations from early math units, for both whole numbers and fractions

Stress importance of working innermost brackets first
Show difference between solving inside bracket and then removing bracket by multiplication or division
Work more complex algebra problems with many steps

SECTION II. EQUATIONS

Objectives:
By the end of this unit, the student will be able to:

- Recognize an equation and name variables and constants
- Balance equations, solving for unknowns
- Work the pie method for formulas finding Area, Ohm's Law, or Percentage by covering the unknown in the pie
- Transpose equations to solve for various unknowns
- Relate algebra to practical problems in which there are one or more unknowns

Materials:
Solving Equations Worksheets. List of formulas.

Class Presentation:
Introduce variables. Solve simple problems for variables
Introduce equations. Solve problems for unknowns
Work practical problems involving one unknown
Stress balancing equations
Show formulas again, stressing how one side equals other: (i.e. Pythagorean theorem, Ohm's Law)
Have students solve practical application problems using formulas on board
Work equations with more than one variable
Solve more complex word problems, assigning variables to set up algebraic formula

Homework:
Assign Algebra worksheet problems and practical problems from the end of some math text chapters.

BLUEPRINT READING

This unit of material is begun after the class is showing some proficiency with measurement, typically after the midterm exam in measurement. A series of lessons are presented to describe working drawings, who makes them and why, and the overall concept of how important it is to have a well prepared plan in order to do any type of building.

That plan, the blueprint, is then looked at in terms of its universal symbols, the concept of scale, and its many individual parts. Students spend some hands-on time during the last few Saturdays making measurements on sample blueprints, recognizing and naming electrical or plumbing symbols, and becoming familiar with a full set of working drawings.

This body of knowledge is approached simply as an introduction to blueprint reading, a means of taking some of the mystery out of a set of plans. A very real goal is to help the students become less intimidated by architectural drawings and to enable them to recognize certain types of plans and their use. Most apprenticeship programs will teach a course in blueprint reading which will take this introductory information to more of a working knowledge.

It is hoped that by covering blueprints in this way, the women will be more open to and less afraid of a full course in blueprint reading. From this position they may be able to perform well and get passing grades on any trade school course covering architectural drawings.

Objectives:
By the end of this unit, the student will be able to:

- Recognize the meaning of blueprints and their use
- Know the various parts to a set of working drawings
- Be able to take measurements from scale drawings
- Know how to express various architectural scales
- Recognize a number of symbols, especially related to the trade of their choice
- Know the steps to follow in reading a set of blueprints

Materials for all units:
Brown, Walter C. (1980). Blueprint Reading for Construction. South Holland, IL: The Goodheart-Willcox Company, Inc.

U.S. Gypsum Advisory Service. (1956). How to Read Architectural Drawings. Chicago, IL: The Modern Hospital Publishing Co, Inc.

Floor plans, elevations, plot plans, several full sets of working drawings. Architectural rulers and regular rulers. Drafting paper.

Class Presentation:

Introduction includes meaning of working drawings and their use
Cover measuring tools and the concept of drawing to scale
Review math related to measurement, conversions, etc.
Go over lines and symbols used in plans
Explain orientation to each type of plan, above, ahead, etc.
Have students draw elevations of complex objects
Explain role of architect, general contractor, developer
Cover plot plans, foundations, elevations, and floor plans
Work with drawings in small groups and answer questions
Study mechanical drawings; point out electrical, plumbing and heating system symbols
Do architectural worksheets converting feet and inches
Have students draw to scale a small room containing cabinets

Homework:
Reading assignments and measurement assignments using objects drawn to scale.

TECHNIQUES OF INTERVIEWING AND JOB SEARCH

The exercises in this unit of study are begun during the first week and proceed up until the time of the final. Often they are done in small groups, to practice interview skills, but some information is first given to the group as a whole. Much of the information and actual exercises for this unit are covered earlier in this manual, in the section called Support Group Component.

This material relates to a primary goal of the program, that of empowering each individual woman with the skills and confidence required to attain the job of her choice. It begins at the level of helping her set realistic goals and understand the difference between short and long range goals.

From this starting point, the woman then goes on to formulate specific objectives around her goals, prepare a resume and job readiness packet, and prepare herself to make a confident and thorough application for the job or training program she desires. A successful interview is the final part of this process.

Objectives:
By the end of this unit, the student will be better able to:

- Deal with test anxiety and anxiety regarding interviews
- Have prepared personal information for application forms
- Complete an application form neatly and correctly
- Know what questions to expect in an interview
- Know what to expect on entry exams to union trade schools
- Have practice in vocabulary, reading comprehension and manual dexterity tests
- Know how to proceed with any exam, how to check work
- Use study time to good use

Materials:
Study skills materials, Arco Test Books.

Class presentations:
Study Skills
Test-Taking Skills and Pointers
Application Forms, References, Past Job Experience
Why People Aren't Hired Information
Apprenticeship Screening Questions for Interviews
Reading Comprehension Tests
Synonym Antonym Tests
Sentence Completion Tests

Homework:
Bring G.E.D. Certificate or H.S. Diploma for Interview Roleplays at beginning and end of course. Prepare Job Readiness folder containing all information requested on typical application. Work practice tests at home. Fill in several application forms for jobs.

PHYSICAL CONDITIONING AND NUTRITION

The PHYSICAL CONDITIONING component of the program has been expanded to give each student an hour of exercise on both evenings of weekday classes, along with an additional period of stretching and muscle tone exercises on Saturday mornings. This amount of focus is designed to help the student develop a regular routine of exercise which they can then make part of their life. It is also necessary since new muscle strength begins to deteriorate after two days of not being used.

A skilled Aerobics/Weight Trainer teaches this component of the course. In order for everyone to have good access to the weight training machines, the class is divided into two groups. One group has a thirty-minute upper body aerobic exercise, coached by the instructor, while the other group works out on the equipment, under supervision of the program coordinator. Then the groups switch places for the second half of the hour.

It has been found that being out of shape can stop women from being able to hold on to a job at which they would like to continue working. Keeping up with the pace is critical on a construction site. Strength is required, but equally important is stamina, and this section of the program helps the students build up both of these.

Objectives:

By the end of the course, the student will be able to:

- Show gains in strength, muscle tone, and balance
- Learn to use proper muscles to lift, carry, and do heavy work
- Be able to track her own progress on a progress chart
- Recognize the importance of nutrition and gain insights into a healthy diet
- See the importance of food intake and stress management
- Know simple, fast exercises for stretching to prevent injury
- Know the use of ice and heat for injuries
- Have a selection of exercises to use to keep themselves in shape, and with which to stretch out before a day's work.

Materials:

Weight room equipment includes the following:

Abdominal Chair	Aero-Dyne Bike
Alternating Leg Press	Bench Press
Chest Press	Chin Up Bar
Free Weights	High Chair
High-Low Pulley	Hip/Lower Back Bench
Incline Bench	Jump Machine
Jump Ropes	Knee Extension/Hamstring Curl Bench
Leg Press	Life Cycles
Preacher Curl	Shoulder Press/Fly
Slant Boards	Stationary Bikes
T-Bar	Universal Weight Machine

Weight Bars

Classroom presentation:

Each piece of equipment is presented as to its use and safety
Introduction to simpler equipment is done in first weeks
More complex pieces of equipment are introduced in following weeks
Some heavy bars are spotted (person using them is watched for safety)
Students use equipment and record number of repetitions at each training station
Students use bikes and aero-dyne to record time and pulse rate
A nutrition lesson is given to review food groups
Stress management and food intake are covered
Proper body position is practiced for lifting heavy objects
Upper body aerobic exercises are done as a group
New games are utilized to build speed and group spirit
Eye-hand coordination exercises are practiced
Additional activities are built in for speed, balance:

Balance Beam Work	Stair Exercises
Running Exercises	Aerobic Tag
Quarter Tag Football	Basketball

The sample course schedule contains a more detailed account of the activities done on each evening, and the gradual building of the exercises can be seen in this schedule.

Homework:

First week assignment: record everything eaten during the week. This information is then studied in discussion of nutrition during second week. End of term diet assessment is done to study change made in dietary habits. Additional exercise assignments are given if a holiday falls during the term.

HANDS-ON AND TRADE SPECIFIC TRAINING

Most of the trade specific lessons occur on Saturdays, and are taught by qualified tradeswomen. A few mechanical and spatial relations tests are covered during classroom time, however, and these materials are presented so that the students will be more familiar with such tests, many of which are the standards for entry into trade schools.

As stated earlier, the hands-on trade specific presentations make up nearly half of the course content. Such a large time emphasis points to the importance of this section on many levels. It allows the students to meet many different tradeswomen and ask specific questions of them. It teaches actual tool use and tool recognition skills. Safety is a major part of every presentation as are good work habits and thorough planning.

This course of study has the overall objective of introducing the students to a wide variety of trades in order that they might find the type of materials and tools with which they prefer to work. It is an exploratory introduction into many types of skilled trades and the work and responsibilities involved in each of them.

On the whole, the students respond with great enthusiasm to this section of the course, looking forward to each new presentation. The hands-on component also offers time for practice with measurement and blueprint reading. A number of support group exercises occur on Saturdays as well. Each session begins with a short stretching and muscle toning segment.

Objectives:
At the end of this unit, the student will be more familiar with:

- Mechanical and spatial relations tests used in an aptitude tests
- The use of aptitude tests, and how to perform while taking them
- Trade specifics: Individual trades and their tools and tasks

Materials:
Sample aptitude test books. Small objects to move in sequence. Mechanical problems tests. Each Trade specific presentation brings its own list of tools to present.

Class presentation:
Mention use of aptitude tests, who gives them, what they measure, how to take them. Cover possible approaches to such a test: time, accuracy.

Work mechanical reasoning test problems on board
Take sample tests; work with specific tasks
Practice Hole Punching Exercises in small groups
Work individually on small parts transfer exercises
Work and review Perceptual Ability Tests
Work and review Hidden Figures Tests
Work Figure Turning Tests in class
Work Spatial Relations Tests in small groups

SECTION I: HANDS-ON TRAINING

Trade specific programs, which comprise nearly 50% of training time, offer direct hands-on training time to the students. The Saturday programs are run by skilled tradeswomen and supervised by the program director. Hands-on training is given a strong emphasis for many reasons, including:

- Women begin the course with few, if any, tool recognition skills. Hands-on work with tools results in dramatic improvement

- The tradeswomen who come each Saturday to present the Trade Specific program in their area offer a role model to the students. Often students go on to make their own trade choice based on what they learned during these presentations

- Individual concepts about what a particular trade may be like are directly confronted during hands-on training. The apprentice may describe how much of her work is broom-pushing or the student may find she hates sawing conduit with a hacksaw. In either case, a more realistic view of each trade comes into play.

- Feedback from the students cite this component repeatedly as the most involving and exciting part of the program. The Saturday presentations put to practical use the classroom learning of the prior week.

- Safety on the jobsite is best taught in a job setting, with hands-on practice with the tools. This enables the woman to start forming habits of safe handling and care of tools, proper use of her own body in lifting and carrying, and care and consideration for those working around her.

Trade specifics are the Saturday presentations that take place through the duration of the course. Normally there are 8-10 different presentations, involving as many as 20 tradeswomen. Often, two or more tradeswomen will work together to present a given trade. One might be an apprentice while the other is at journey level. This gives the class exposure to the types of tasks one might be assigned as an apprentice, and how they might differ from those of a journey level worker.

Class meets in an open workshop area from 9 a.m. until 3:30 p.m. Activities begin with stretching and muscle toning exercises to supplement the physical conditioning of the weekday classes. This activity helps everyone prepare for the lifting and physical work that will make up the day's activities.

The tradeswomen of the day then begin to present their tools and the scope of the work they do on a construction site. This will include the conditions under which they work. Safe handling of each tool is covered in detail. Students handle the tools, examine them, and record information on their proper care and safe use.

After a short presentation, the hands-on activities of the day begin. For the duration of the work day, women go to various "stations" to do practice activities (i.e., bending conduit to an assigned degree bend) and work with the tools of the trade being studied.

Any station that involves a power tool or a sharp hand tool (such as a chisel) has a tradeswoman "on hand" to assist with each cut and to watch for safe handling techniques. At first sight of unsafe use, the student is interrupted so that no accidents occur. The proper name of the tool and its safe use will be reviewed with the woman as she prepares to use it. In addition, OSHA (Occupational Safety and Health Administration) guidelines for a safe worksite are covered.

Some stations may involve a set of instructions to be followed, such as a faucet, hinge, or door knob installation. Here the student must combine reading skills and concentration. Stations will nearly always involve taking measurements and cutting materials to a specific length.

****

A lunch break is treated as a work-day break. Women are asked to bring a bag lunch and the group meets as a whole during the break. This is an open question period, during which more personal questions may be asked of the tradeswoman:

How does she handle childcare for her children?

How do the men on her jobsite treat her and other tradeswomen?

What was the procedure for entry into her trade?

How long did she wait to get in?

How many years are involved in the apprenticeship process?

How does she handle racism on the job? Sexism on the job?

These and similar questions are part of the active lunch break discussion.

The question-answer period of each Trade Specific presentation is a major source of current information on the ever-changing procedures for gaining access to each trade. Often a tradeswoman knows whether her Local is accepting applications, or when an upcoming entry test will be given. She relates how many years the training will take, and what the course of study will involve. Students interested in that particular trade can form their own personal career change plan around information given out at this time.

Even more important, it becomes clear from each tradeswoman's presentation the level of commitment and responsibility she has taken on in choosing to work in her field. Whether it is the five a.m. alarm clock, or the two-hour drive to work, the information shared gives serious pause to women considering the career change to that field. The thought here is that it is far better to know the expectations of employers in advance. There is no need for large numbers of women to enter the trades, only to find that they really have no interest in showing up for a seven a.m. start.

The level of commitment and responsibility mentioned above is further developed as each tradeswoman communicates how deeply proud she is of what she does for a living. The pride and confidence come through loud and clear during this sharing period and do much to inspire the students, and to encourage them to follow their interest in the skilled trades.

* * * *

After lunch, the class will often do an assigned project. During the framing carpentry hands-on, they may work together to build a small knee-wall house. During the electrical session, they may electrify one wall or wire some switches and lights to make them work. Pipefitting offers some pipe installations to assemble or pipe joints to take apart. During the cabinet-making hands-on, the women laminate the faces of a board to make a finish veneer or laminate piece that they can then take home with them.

At the completion of the project, the objects built need to be disassembled and materials stored for the next class sequence. The class helps to clean the area and store tools or carry them to the tradeswomens' vehicles.

It should be noted that all of the work during the hands-on component, as with the classroom and physical conditioning parts of the program, is done in a supportive and helpful manner. The woman handling her first power tool is not criticized for her fear or hesitancy; rather both her classmates and the tradeswoman instructor encourage her to try, but at a pace that is correct for her. The reasoning behind this philosophy is covered in more detail in the Support Group section of this manual.

This approach is especially important when exercises are done involving height or balance. Women hanging back from ladders or scaffolding are given words of encouragement and helped through the exercise. If they opt not to climb and recognize that heights are an issue for them, this gives insight into the fact that their trade choices are limited. Any of this information can be processed after the exercise in a group setting. Also discussed is the attitude of men in such situations and the types of heckling that could be an added dimension when a woman is working up high on a jobsite.

SECTION II: TRADE SPECIFIC PRESENTATIONS

The following list may vary slightly during any one training sequence, but about half of the following will be given a Trade Specific concentration during one training sequence. They represent the pool of tradeswomen available to Chicago Women in Trades for this type of presentation, and the selection of programs in any one sequence or semester will be adapted to the interests of the women in the class that term.

Auto Mechanics
Building Engineers
Cabinetmakers
Carpenters
Drywallers and Tapers
Electricians
Insulation Installers
Flooring Installers
Laborers
Masons
Operating Engineers
Ornamental Ironworkers
Painters
Pipefitters
Plumbers
Sprinkler fitters.

In addition, the principles of safe lifting, carrying, leverage, and mechanics are covered for all building materials. An introduction to the safe use and care of tools is covered as part of each presentation as well. (See following section on Safety).

A final word on trade specifics. The intent here is to introduce the students to a fair number of skilled trades. This one-day introduction is by no means to be interpreted as learning "to be a carpenter or a plumber." More hands-on practice with particular tools can be scheduled if a number of students request it. For the most part, however, this format enables women to get a sense of what is involved in each of the trades covered.

It should be noted that this particular format for short, introductory training about a wider selection of (usually 8-10) trades seems to meet the needs of CWIT's current clientele for the program. Schools in other parts of the country utilize other formats, ranging from presenting only three trades with a building project extended over several weeks to presenting as many as 20 trades with only a very cursory look at any of them. Should the needs of the women entering CWIT's program change or should the number of fields readily open to women decrease, the project goals in this area would be re-evaluated and the format adjusted.

SECTION III: SAFETY

Safety lessons begin with the first Saturday Hands-on session and continue with each subsequent lesson. Instructions are approached under three general topics: Safety Equipment, Safe Use of the Body and Safe Use of Tools.

Safety Equipment

The importance of safety equipment comes up during every hands-on session. Safety gloves and glasses are available, as are some pairs of ear protectors and knee pads. Women are required to wear safe and substantial shoes, although not all of them have obtained work boots at this point. They have obtained hard hats during a field trip during one of the first weeks of class. Dust masks and respirators are available.

In addition to wearing this and other safety equipment during class, students are asked to keep a running list in their survival kit notebooks so that they may begin to purchase these items for themselves. Likewise, students are tested on their knowledge of safety equipment and safe use of tool on both the midterm and final (and orally, before every new tool use). With emphasis, the use of safety equipment becomes clear to them.

Safe Use of the Body

A material handling lesson is scheduled for early in the training session. It serves the dual purpose of acquainting the women with common construction materials, (sheathing, bundles of pipe, stacks of lumber) and instruction on how to lift and carry these materials in a safe manner.

Safe lifting involves bending the knees, using the strong quadricep muscles in the legs, not overextending the back. For long or awkward materials, (2 x 4s, or 4 x 8 sheets of plywood) safe lifting involves finding the center point of balance for the material, leaning into the material at that point, and carrying the weight balanced on this point.

Setting materials down safely is just as important as lifting. Basically this requires reversing the lifting procedures, backing away from the pivot point, and bending the knees again as the object is lowered to the ground.

In addition to lifting, students also practice with small hand tools to gain a working knowledge of the principles of leverage. Pry bars in many different sizes are available, as well as hammers and 16 penny (d) sinkers. The women nail in the spikes, then practice correct stance while pulling them back out again.

Lesson plan activities involve setting up a rotational area in which each woman continues to practice, until she gains proficiency in, each of the following tasks:

- Nail in without bending at least ten 16 d nails (butt nailing)
- Pry out nails, using correct body positioning and leverage
- Toenail galvanized finish nails into tongue and groove flooring
- Set finish nails with a nail set
- End nail 2 x 4 sections of wall together, keeping safe stance

- Lift and carry a 4 x 8 sheets of plywood (1/2") length of room
- Carry 3/4" plywood or chipboard, if able, if not, work with partner to carry the sheet the length of the room
- Safely lift and carry piles of 2 x 4s, keeping safe distance
- Lift and carry 70 lb. buckets of primer and taping compound
- Safely carry ladders and planking, set up and climb.

Safe Use of Tools

Far too many tools are introduced in the Saturday sessions to list them all, along with their proper care and safe use, in this manual. Let it suffice to say that as every tool is introduced by a tradeswoman, the introduction is accompanied with a thorough lesson in the proper handling of that tool.

This principle applies to all hand tools as well as to power tools. In the same way, it applies to construction aids such as ladders, planks, and scaffold systems. Proper set-up, body positioning, and follow through with each tool is reviewed in detail. Then, as each woman practices with the power tool being studied, an instructor is at her side to watch for and interrupt any unsafe maneuvering.

Hand tools are taught keeping a number of safety principles in mind:

1. Wearing all applicable safety equipment
2. Setting up at a safe distance from any nearby workers
3. Positioning one's body in a stable and safe stance
4. Holding the tool properly, a firm but not tense grip
5. Keeping tool out of line with one's own body
6. Keeping hands on tool and workpiece, not in path of tool
7. Placing tool back in proper place when finished with task

Power tools are introduced with the following safety procedures:

1. Unplug tools when making all adjustments and when demonstrating its parts
2. Make all adjustments to blade depth and angle before starting
3. Make sure all blades (routers, all types of saws, power planes) are secure and properly installed
4. Never have blade touching wood at start-up (with any tool)
5. Table of tool keeps in contact with material (sawzall,circular saw, wormdrive, router)
6. Use follow-through all the way across piece (laminate edger, saw)
7. ALWAYS check guard placement before setting any power tool down
8. Unplug tool when discontinuing use
9. Make sure extension cords never cross through damp areas
10. Keep hands and body clear of path of blade (table saws, all tools, hand and power)

Finally, safe work principles are covered separately under each Trade Specific Seminar. A few important safety principles are mentioned herein:

1. Electricians cover the necessity of turning off all power to a line being worked on, and then padlocking it in OFF position with personal padlock.

2. Pipefitters cover safe body positioning when using two tools simultaneously, as well as pinch points, and safe stance when in awkward positions.

3. Building maintenance persons cover special dangers of working around fan, pump, and boiler systems, safe set-up and special insulated tools for such situations.

4. Carpenters cover hand tools as well as power tools, the importance of shoring up or building temporary support walls in cases where this is required.

5. Cabinetmakers stress the importance of using sharp blades and tools which are in good working condition, including safe cords and neat, clean work areas.

6. Laborers stress using the right tool for the right job, not too large or too small a pry bar, using wheelbarrow correctly, etc.

7. All tradeswomen, regardless of their field, stress ignoring dangerous commands given by co-workers. They see, rather, how important it is to know safety principles as listed by OSHA (Occupational Safety and Health Administration) backward and forward, and to follow them to the letter.

The above list could go on and on, as each tradeswoman has many safety rules to teach. Students using incorrect procedure have this procedure interrupted, and then correct safe use of the tool is retaught.

Finally, SAFETY is a first and foremost focus of the entire course, with the goal in mind of keeping not only current students safe, but one day helping to make the entire construction industry a safer place in which to work.

SECTION IV. FIELD TRIPS

For many women, mention of the skilled trades evokes only a general foggy notion of men in hardhats and not much particular imagery concerning the conditions of an actual construction worksite. Thus, in addition to hands-on work with the tools of the trades in a supportive setting, it is necessary to experience construction sites and industrial workplaces as they occur in their natural state. The noise alone can be an awakening situation for a woman who has never thought of the aspect of many power tools in the same place.

Exercises and Events:

During the first week of classes, the Apprenticeship Information Center is asked to give a presentation (covered with more detail under Support Services Component). During this presentation, students gain very useful information on the process of entering the trades, their rights regarding age limitations, and the essentials of transportation and timeliness in the construction industry.

Registration with the AIC computer system will enable the students to receive word of any trades (in which they register an interest) that schedule an entry exam or open their application process. Students are encouraged to team up to make the trip to the AIC office to fill out their individual registrations.

Early in the sequence, a slide show ("Out of Ashes Rehab") of a rehab construction project is shown, illustrating before and after scenes of a six-flat building being brought back to life after a sequence of arson fires. The slides illustrate all aspects of construction and show all the systems being redone from scratch, including masonry work, insulation, plumbing, heating, carpentry, drywall, taping, trim carpentry, oak flooring, ceramic tile, carpet, and new door and window installations. The detailed presentation helps the students learn the terms for various items in construction (beams, posts, studs) and also learn the sequence for tasks on a building being rebuilt.

If the class shows interest, the Structural Ironworkers are invited to bring their film promoting their trade to a class meeting. The film shows ironworkers "walking the rails" of high rise structures, assembling the first pieces of metal that will form the basis of a large building.

A field trip is scheduled to the training facility of the Operating Engineers during each semester. Besides the large cranes, lifts, bulldozers and other moving equipment, there are welding booths, workrooms and equipment repair facilities that are well worth seeing. Often a number of women will be putting in training hours at the site, adding a role model factor to the field trip.

One or two visits to construction sites in progress are equally helpful. These offer the reality that of the many workers to be seen, often the class will be lucky to see one woman present. The noise level, the "empty spaces" through which one could fall several stories, the tied off outside edges of the building all have an impact. Equally though, the class gains a sense of pride and accomplishment of what is involved in building a structure from the ground up, and what it would feel like to be part of such a task as part of one's life work.

Additional trips have been made to visit the bricklayer's training school, a cabinet-making shop, engineering shops, and similar sites. On occasions, women in the training program have learned about a whole new career which then influences their trade choice. Part of the purpose of these field trips is to widen the vistas, helping women choose from a larger selection pool the trade that feels right for them.

THE COUNSELING COMPONENT

Two counseling positions (one job counselor and one job coordinator) have been funded to provide additional support to the program and to assist students in their career transitions. In addition to working with the students on job search issues, the counselors will foster liaisons with construction sites at which jobs might be opened up to tradeswomen. They also provide advocacy for tradeswomen who are experiencing difficulties with their employers or co-workers. Furthermore, the counselors plan support group meetings of tradeswomen monthly at the office.

In direct work with the training program, however, the counselors are responsible for the following parts of the training sequence:

They prepare public service announcements and speak to groups to announce upcoming training sequences. This public relations work acts to advertise the program and all the services of the organization. Women who sign up or call in after hearing about the program are asked to fill out an application and schedule an interview.

They plan and carry out the Orientation Day of introductory presentations and displays designed to help women gain insight into the trades and the training program run by the organization. Scheduled speakers are usually tradeswomen, a local union representative, trade school personnel, and the training coordinator. In addition, a number of tradeswomen are asked to attend and set up tables with their tools and photos of their work.

Both before and after the Orientation Day program, the counselors conduct interviews with women who want to take the course. This application process is a full interview at the office during which the counselor can determine whether the woman is ready for the course, her schedule is clear, childcare needs are met, and she has met the minimum requirements. In brief, these requirements are 1) G.E.D. Certificate or H.S. Diploma, 2) Driver's License, and 3) no conflicting coursework or schedule conflicts.

The counselor then approves or postpones approval of the applicant. If she has not completed the basic requirements, she can be referred to a G.E.D. program, or given other recommendations concerning what to accomplish before returning to apply again. A woman may make more than one application to the program.

Once the training sequence begins, the counselors are scheduled to be present at a class session during the first week of class (often scheduled along with a presentation by the Apprenticeship Information Center). During this class meeting, they describe their roles and list their office hours for the class members. In addition they will request that every member of the class schedule an appointment with them to prepare a personal job search plan.

At this time, follow-up surveys and additional counseling for class members who have graduated and are working in the trades are the responsibility of the counselors. Women experiencing lay-offs or repeated problems are to stay in touch with counselors so that the program may monitor women's overall progress in the trades. A follow-up survey is sent out every four months to all former students.

FUTURE DIRECTIONS

As the program completes more and more training sequences, a larger selection of feedback returns to the organization from the women who are graduates of the course and who now work or train as apprentices in the skilled trades. This feedback is put to immediate use in adjusting the curriculum to add any content that is found to be needed as women enter the trade schools. Changes of this type are simple to put in place, and the gratification is immediate, as the next group of graduates is even better prepared than those before them.

SECTION I : CHILDCARE

Other needs that are being identified, however, raise more complicated issues and will take more planning to put in place. One example of this is the request for childcare. At this time, the program receives many inquiries regarding childcare. Yet it is currently unfeasible to offer any formal provision for the women who have small children at home and wish to enter a ten-week training sequence. Therefore, it falls upon the women to seek out childcare and back-up childcare for their children during the entire sequence. The women are making a time commitment to the program of twelve hours every week. The cost of childcare for this amount of time also falls upon the women.

As a feminist program stressing women's resources and the solidarity and strength to be gained from forming support groups with other women, it appears a major oversight to not deal with the childcare issue directly. While it is true that the responsibility rests with the parent, and equally true that prospective employers (at construction sites) in the trades will not be offering childcare for many years to come, Chicago Women in Trades looks forward to a time when childcare is a responsibility of the larger society. In anticipation of this time, the organization is exploring ways of being more helpful around this issue.

One possible direction is that the pre-screening interviews could group those women in need of childcare and then recommend that they pool their resources for a group childcare provision. Perhaps Chicago Women in Trades could provide a place for this childcare, at least during the Saturday programs. In a group setting, the costs could be less, and the organization could assist with those costs.

SECTION II. ONGOING STUDY GROUPS

The training program run by Chicago Women in Trades grew out of a request for tutoring on the part of women in an apprenticeship program. At the end of each training sequence, the students resound with the same need for an ongoing study group with a qualified instructor. This program would assist them while enrolled in the trade school pre-apprenticeship program of their choice.

This "future" direction was taken as a formalized step as this manual went to print. Tutoring is now being offered one evening a week to any prior program participants, allowing them to make further progress with their math and measurement skills.

SECTION III. REVOLVING FUND FOR NEW PRE-APPRENTICES

There is a proposal now under consideration by the Board for the creation of a credit union program which would be available to women currently in unpaid training programs. This loan program would be sponsored by CWIT and would assemble financial resources to offer no-interest loans to graduates of CWIT's program who are in need of monetary assistance during their three to four month pre-apprenticeship periods. Immediately upon completion of that program, beginning with the first pay period as an apprentice, the woman would make monthly payments to the revolving fund.

This fund would assist women who qualify for Apprenticeship programs but who are unable to financially sustain themselves through an initial study period of three to four months without pay. A fair number of women who complete the CWIT training and then wish to pursue jobs in the skilled trades are unable to financially make it through the initial non-paid training periods.

A loan to an individual woman could be made on the basis of her needs and lack of other sources of income to sustain her. The maximum loan amount would be $2,000. It would be based on the amount needed for the woman's anticipated costs for housing, food, medical, childcare and insurance for the pre-apprenticeship period. A transportation stipend is normally granted through the apprenticeship programs and would not need to be included. Obviously, a woman would be encouraged to find ways to meet some of the above costs through other assistance, and would then apply only for a small portion of financial help to help her through the study period.

It has been clear that this period of non-pay represents a major hurdle to women attempting to enter the skilled trades, and an assistance program of this type is a matter of high priority.

SECTION IV: INSTITUTIONALIZATION OF CURRICULUM

A final word on future directions refers to the purpose of this manual itself. One of the hopes behind producing this guide is that it will help programs of this type spring up in more and more places and become institutionalized across many segments of society. Programs of this type could be offered in high schools, at community colleges, at vocational-technical schools, and even at shipworks, millworks and large industries.

In addition, a curriculum of this type could be adapted for special groups, such as women who have recently been incarcerated, or young women who are wards of the state, or high school students who show an interest in the skilled trades. Throughout the country at this time there are programs geared to women considering career changes, especially displaced homemakers. Such programs could look to this manual for additional content for their existing programs.

As more and more women enter the trades, they will no longer be seen as the exception. Rather, they will begin to be seen as a standard, personifying the right of all women to pursue whatever career appeals to them. As this process occurs and more of these women become visible in the society at large, more young women will consider the trades, and the demand for programs of this type will grow. Training programs for women, stressing safety, confidence and well thought-out work principles will be a key to helping with the creation of a more humane and safe workplace for all.

APPENDICES

BIBLIOGRAPHY

BOOKS

Bradford, Robert. (1975). Mathematics for Carpenters. Albany, NY: Delmar Publishers Inc.

Brown, Walter. (1980). Blueprint Reading for Construction. South Holland, IL: The Goodheart-Wilcox Co.

Carman, Robert, A., and Saunders, Hal M. (1986). Mathematics for the Trades: A Guided Approach, Second Edition. New York, NY: John Wiley & Sons.

Garrard, Crawford G., and Herman, Stephen L. (1987). Practical Problems in Mathematics for Electricians. Fourth Edition. Albany, NY: Delmar Publishers Inc.

Howett, Jerry. (1988). Number Power 1: Addition, Subtraction, Multiplication, and Division. Chicago: Contemporary Books Inc.

Howett, Jerry. (1988). Number Power 2: Fractions, Decimals and Percents. Chicago: Contemporary Books, Inc.

Mitchell, Robert. (1989). Number Power 3: Algebra. Chicago: Contemporary Books, Inc.

Hunt, Margaret, and Munro, Constance. (1982). Life Skills for Women in Transition. Newton, MA: WEEA Publishing Center.

Huth, Harry C. (1985). Practical Problems in Mathematics for Carpenters. Fourth Edition. Albany, NY: Delmar Publishers Inc.

Kaser, Joyce S., Ed.D., and Frazier, Alethea C., M.Ed. (1989). Juggling Lessons: A Curriculum for Women Who Go to School, Work, and Care for Their Families. Andover, MA: The Network, Inc.

Lange, Arthur J., and Jakubowski, Patricia. Responsible Assertive Behavior Procedure for Trainers. Champaign, IL: Research Press.

Levy, Joan U., and Levy, Norman. (1982, 1989). Mechanical Aptitude and Spatial Relations, Second Edition. NY: Arco Book, Prentiss Hall Press.

Martin, Molly, Ed. (1988). Hard-Hatted Women: Stories of Struggle and Success in the Trades. Seattle, WA: The Seal Press.

Olivo, C. Thomas and Olivo, Thomas P. (1977). Basic Mathematics Simplified. Albany, NY: Delmar Publishers Inc.

Olivo, C. Thomas, and Payne, Albert V., and Olivo, Thomas P. (1983). Basic Blueprint Reading and Sketching. Albany, NY: Delmar Publishers Inc.

Smith, Robert. (1982). Applied General Mathematics. Albany, NY: Delmar Publishers Inc.

U.S. Gypsum Advisory Service. (1956). How to Read Architectural Drawings. Chicago, IL: The Modern Hospital Publishing Co, Inc.

Wagner, Willis H. (1979). Modern Carpentry. South Holland, IL: The Goodheart-Wilcox Company.

FILMS

Never Underestimate the Power of a Woman. Madison, Wisconsin. Bureau of Audiovisual Instruction, University of Wisconsin.

Rosie the Riveter. Clarity Educational Productions,Inc. Franklin Lakes, NJ. Time: 60 minutes.

Women In Apprenticeship. San Francisco, CA. Gordon Newsfilm.

PERIODICALS

Crawford, Deborah Evans. *WorkAbles for Women.* Oak Valley, Clinton, PA. 15026-0214. Catalog for women's work clothes.

Tradeswomen Magazine. P.O. Box 40664, San Francisco, CA. 94140.

VIDEOTAPES AND SLIDESHOWS

Go for It. (1985). Alaska Department of Education. Juneau, AL. Video.

Out of Ashes Rehab. (1982). Eileen Kreutz. Retrofit and rehab of low-income co-op housing development. Chicago, IL. Slideshow.

More Choices: Non-traditional Employment for Women. Available through Illinois Vocational Curriculum Center, Sangamon State University, Office 7-Z, Springfield, IL 62794.

More than a Building. (1990). Chicago: Stein Development Corp. Time: 3 1/2 minutes. Video.

Mythbusters. (1987) New Jersey: Project Tide, Jersey State College. 25 minutes. Video.

There is No Such Thing as Women's Work. Chicago Women's Bureau, U.S. Department of Labor. Video.

Trade Secrets: Blue Collar Women Speak Out. (1985). Stephanie Antalocy, Dir., and Skip Sweeney. New York, NY: Women Make Movies, Inc., Distributor. Time: 23 minutes. Video.

What about Women: Women and Non-traditional Occupations. (1989). Hartford, CT. Video.

(Ap)2

LIST OF ORGANIZATIONS

The following is a sample list of organizations currently providing training, support and advocacy for women in non-traditional jobs:

Apprenticeship and Nontraditional Employment for Women (ANEW)
3000 NE 4th
Renton, Washington 99055

Boston Tradeswomen's Network
P.O. Box 255
Dorchester, Massachusetts 02122

Chicago Women in Trades
37 S. Ashland
Chicago, Illinois 60607

Georgia Women in Trades
6335 Riverdale Road
Riverdale, Georgia 30274

Hard-Hatted Women
P. O. Box 93384
Cleveland, Ohio 44101

Minnesota Women in the Trades
550 Rice St.
St. Paul, MN 55103

National Tradeswomen's Network
54 Mint Street, Suite 400
San Francisco, California 94130

Non-traditional Employment for Women
105 E. 22nd St., Room 710
New York, New York 10010

O.N.O.W.
Polaris Joint Vocational School
7285 Old Oak Boulevard
Middleburg Heights, Ohio 44130

Oregon Tradeswomen's Network
P.O. Box 86620
Portland, Oregon 97286

Step-Up for Women
Northern New England Tradeswomen
1 Prospect Avenue
St. Johnsbury, Vermont 05819

Tradeswomen, Inc.
P.O. Box 40664
San Francisco, California 94140

Tradeswomen of Philadelphia
P. O. Box 5904
Philadelphia, Pennsylvania 19137

Tools for Change
Madison Tradeswomen
C/O Employment Options, Inc.
2095 Winnebago Street
Madison, Wisconsin 53704

Wider Opportunities for Women
1325 G St. NW
Washington, DC 20005

Women and Employment
1217 Lee Street
Charleston, West Virginia 25301

Women's Bureau
U.S. Department of Labor
Room 53312
200 Constitution Avenue, N.W.
Washington, D.C.

Women Empowering Women
P. O. Box 6506
Albany, California 94706

Women in Fire Suppression
411 Marathon Avenue
Dayton, Ohio 45406-4846

Women in the Building Trades
C/O Roxbury Community College
1234 Columbus Avenue
Boston, Massachusetts 02120

Women Unlimited
1250 Turner Street
Auburn, Maine 04210

(Ap)3

SUPPLEMENTAL MATERIALS

"The class helped me with everything, it gave me the basics for all the math that I would need for my apprenticeship and introduced me to the tools and how to use them."

Persistence paid off for Dawn Gowens who wanted to be an electrician since her sophomore year in high school. She took shop classes in high school and served in the Army for three years as a radio electrician. When she returned home to Chicago she found out about the trade apprenticeship programs. Dawn explains, "They keep that information very secret, it's hard to find out about."

She applied to Electrician's local #134 in 1987 and she waited two years to be called from the list. Meanwhile, she attended CWIT programs and enlisted in the Pre-Apprenticeship Tutorial Workshop. Dawn says about the class, "it was great preparation. Even with the class work in the Army, I had never been that great a student and this refreshed my math skills. I would recommend it to anyone. It's a must, especially the longer you've been out of school."

Currently Dawn is working as an electrical apprentice for an electrical contractor and she is enjoying her work.

"I would recommend it to anyone. It's a must, especially the longer you've been out of school."

Diane Kieres attended CWIT's Pre-Apprenticeship Tutorial Workshop in the Spring of 1990. She is now working as a carpenter apprentice with local #54. Diane's interest in the trades came from her family. Her father is a bricklayer and she worked with him as a teenager when he renovated their house. After working as a physical education and health instructor, Diane decided to pursue a career as a carpenter - which was her life dream.

Diane maintains that CWIT gave her the extra push and the confidence to go out there and make her dreams come true. She says, "The class helped me with everything, it gave me the basics for all the math that I would need for my apprenticeship and introduced me to tools and how to use them. I got to use a skill saw for the first time in the class. It also helped me with my body mechanics, how to pick up a piece of plywood and the importance of not getting injured."

CHICAGO WOMEN IN TRADES

Pre-Apprenticeship Tutorial Workshop

Program Goals:

- orient women to skilled trade career opportunities
- provide women with basic skill training
- assist women with self assessment
- provide a supportive environment for women to develop strategies for entering and remaining in non-traditional jobs

Curriculum:

- basic and applied math
- mechanical and spatial aptitude
- introduction to blueprint reading
- physical conditioning
- hands-on experience
- work with skilled tradeswomen
- tool recognition

Brochures available through Chicago Women in Trades.

BEST COPY AVAILABLE

CHICAGO WOMEN IN TRADES
PRE-APPRENTICESHIP TUTORIAL WORKSHOP APPLICATION

Please fill out accurately, all statements herein are subject to verification. Date_____

I. PERSONAL INFORMATION

Name_____ Social Security #_____
(last) (first)

Address_____City_____State_____Zip_____

Phone Number_____(home)_____(work)

Age_____ Date of Birth_____ Height_____ Weight_____

Number of Dependents _____
Race (please X): African American____ Asian____ Latina____ Native American____
White____ Other ____

II. TRADE INFORMATION

Trade Preference_____ Referred by_____

Have you applied to a trade or an apprenticeship program? Yes____ No____

Which Trade?_____ When?_____

Did you complete the application procedures for that trade? Yes____ No____

Including: Testing_____ Interviews_____ Submission of necessary documents?_____

Are you currently enrolled in another Training Program? Yes____ No____

III. AVAILABILITY

Will you be able to attend every class meeting? Yes_____ No_____
Explain_____

Do you have a valid Illinois Driver's License? Yes____ No____
Do you have a Child Care plan? Yes_____ No_____
Do you have an alte native Child Care plan in the event the first plan has to be cancelled?
_____
Do you have a plan for Transportation to the classes? Yes____ No _____

IV. EDUCATION

Circle highest grade completed:

1 2 3 4 5 6 7 8 9 10 11 12 More

Are you a High School graduate? Yes____ Date_____ No____

Do you have a G.E.D.? Yes____ Date_____ No____

Name of High School: _____ City_____ State_____

Are you a College graduate? Yes____ Date_____ No_____ Major_____

Name of College: _____ City_____ State_____

(Ap)5

V. HEALTH

What is the present condition of your health?_____
Do you have any serious illness or physical disability that would prevent you from doing physically strenous work or exercise?_____Explain_____
_____

When did you have your last Physical Examination?_____

Are you presently under a Doctor's Care?_____ Explain_____

Do you Exercise or Engage in Sports?_____

VI. BACKGROUND, SKILLS AND ASSESTS FOR SUCCESS IN THE TRADES

Have you had any prior experience, paid or unpaid, related to Nontraditional Work ? (i.e. Heavy Cleaning, Yard/Garden work, Warehousing, Physical Labor) Describe:_____
_____
Have you helped/observed anyone working in the trades (such as electrical, carpentry, plumbing, etc.) _____
What are your Hobbies? Explain what you do and how frequently:_____
_____
Do you own a Car? Yes____ No_____
Do you have or own Hand Tools? Yes____ No_____
Have you ever had membership in any Union? Yes_____ No_____

VII. GENERAL EMPLOYMENT RECORD

List your past employer beginning with the most recent:

Name & Address of Employer

_____City_____State_____

Position	Salary	Dates worked	Reason for leaving
_____	_____	_____	_____

Name & Address of Employer

_____City_____State_____

Position	Salary	Dates worked	Reason for leaving
_____	_____	_____	_____

Name & Address of Employer

_____City_____State_____

Position	Salary	Dates worked	Reason for leaving
_____	_____	_____	_____

I CERTIFY THAT ALL THE INFORMATION HEREIN IS TRUE AND I GIVE MY PERMISSION TO CHICAGO WOMEN IN TRADES TO VERIFY ALL INFORMATION.

_____ _____
Applicant's Signature Date

(Ap)6

(Note: The interviewer should ask to see the H.S. Diploma or G.E.D. Certificate of the person they are interviewing. The questions below are a general guideline to follow. It is more realistic if the person doing the interview is a bit cold and unsupportive, perhaps even discouraging to the applicant.

JOINT APPRENTICESHIP SELECTION COMMITTEE QUESTIONS

THE FOLLOWING ARE SAMPLE QUESTIONS THAT MAY BE ASKED DURING AN INTERVIEW. YOU SHOULD ANSWER ALL QUESTIONS AS COMPLETELY AS POSSIBLE.

1. Why do you want to be a . . . . . ?

2. Why did you choose . . . . . over some other trade?

3. Have you ever seen someone do this kind of work?

4. Construction sites are cold in winter, hot in summer; they can be muddy and wet. What makes you consider working in these conditions?

5. What kinds of work have you done in the past?

6. The language on a construction site gets pretty rough sometimes. Do you think you can take it?

7. Can you travel? (asked only if traveling is required).

8. Do you have childcare taken care of? (They will say babysitting).

9. (If the applicant has any college.) I see you went through. . . years of college. Why aren't you working in the field for which you received that education?

10. How do you feel about going to school as part of your Apprenticeship?

11. Is there anything else that you would like to tell us about yourself?

(A general question such as the last one provides you with the opportunity to describe anything that was not covered by previous questions and that you think is important).

(Ap)7

37 South Ashland
Chicago, Illinois 60607
312/942-1444

Orientation Schedule - February 23, 1991

SIGN-IN (main lobby) 8:30-9:15

PROGRAM (main hall) 9:15-10:30

* Introduction to Chicago Women In Trades
* Remarks from Tradeswomen
* How to Become a Member
* Pre-Apprenticeship Tutorial Program --Eileen Kreutz Instructor

Age limits -- your legal rights -- Bridget Arimond Director Women's Law Project, Legal Assistance Foundation

* Job Corps -- Margaret Tucker
* Washburne Trade School -- Jean Crawford

SMALL GROUP DISCUSSIONS (basement) 10:30-12:00
Visit the table of your choice

* Tradeswomen Show & Tell tables
* Pre-Apprenticeship Tutorial Workship tables
* Apprenticeship Information Center table

VIDEO SHOWINGS 1st floor) 10:30-12:00

Myth Busters

Tool & Manufacturing Association Video

Trade Secrets

You Can Do It In Construction Technology

Orientation to Non-traditional Occupations

(Ap)8

Fall Term 1990

Program: Pre-Apprenticeship Tutorial Workshop

Course Length: Ten Weeks, From Tuesday, Oct. 9 through Thursday, Dec. 13, Graduation Evening.

Class Times: Tuesday and Thursday, 6 p.m. - 9 p.m., Malcolm X College
Saturdays, 10 a.m. - 3 p.m. CWIT Office

Instructors: Eileen Kreutz, Training Coordinator
Angela Diaz, Math Instructor
Cynthia Roby, Physical Conditioning

Office: CHICAGO WOMEN IN TRADES
37 S. Ashland, Chicago
Phone: 942-1444.

Course Description:
This course is designed to prepare women to take and pass entry exams into the various skilled trade apprenticeship programs around the city of Chicago. Preparation includes class coverage of Math and Measurement, Blueprints, Aptitude Test materials, Tool recognition, Study Skills, Safe use of tools and material handling, Formula usage, Spatial Relations and Physical Conditioning. Classes address the knowledge, self-esteem and job skills needed for women to survive in the field of non-traditional employment, with the overall goal that they may be able to gain work in the skilled trades and to persevere in those positions.

Course Competencies:
Upon successful completion of this course the student will be able to:

1. Demonstrate accurate linear measurement of materials down to 1/16th of an inch, with understanding of thirty-secondths and sixty-fourths.

2. Know what to expect regarding aptitude tests on apprenticeship entry exams, and have materials on which to develop proficiency.

3. Understand scale drawings, principles of blueprints, symbol usage, and how to read sketches and working drawings.

4. Show improvement in basic tool recognition, proper identification, and safe handling and usage of both tools and materials.

(Ap)9

5. Learn the functions of individual trades and their scope of work through trade specific seminars, on Saturdays at the office space, with Hands-On practice and interaction with tradeswomen.

6. Show a marked increase in physical stamina, strength and endurance through an intensive physical conditioning program.

Course Requirements:

1. Attendance, active participation in class, and completion of all reading and weekly assignments in preparation for class (10 points).

2. A written notebook recording newly introduced information, use of tools, formulas, blueprints, etc., to be graded at final. This notebook will also contain journal entries logging class activities and concepts learned(10 points).

3. Creation of a personal "survival kit" that will include: Documents required for entry to skilled trades; Personal responses to common interview questions; A list of safety equipment to assemble for use on the job, categories of tools needed for each of the various trades, a file of stretching and conditioning exercises with which to stay in shape, and a support network among classmates and tradeswomen in the organization by which to sustain one's perseverance. (20 points).

4. Midterm Exam: Testing Math and measurement proficiency. Fractions and decimals, word problems, and formula usage, safety. (30 points).

5. Final Exam: Math, measures, safety, tool recognition, (30 points).

Grades: Satisfactory, Unsatisfactory supplied to City Colleges. Class grades assigned on following system: A = 91-100; B = 81 -90, C = 71 - 80; D = 61 - 70.

Course Schedule:
First Hour each evening: Math: progressing through problems using fractions, decimals, percentages, formula usage, word problems, squares and square roots, algebraic equations, exponents, ratios, units of measure.

Second Hour each evening: Blueprint Focus: Including Study skills, aptitude test materials, Spatial relations, Job interview skills and esteem building; Communication with sketches; Map reading; Legal rights and remedies; Dimension exercises, including geometric figures and formulas.

(Ap)10

Third Hour each evening: Physical conditioning: beginning with stretching exercises, moving into stamina, balance, aerobic, and weight-lifting exercises. Each student to work at her own level and make progress through duration on course. Use of New Games and sports.

Saturday sessions (to be held at 37 S. Ashland): Trade specific seminars with women in various building trades, information regarding apprenticeship programs, trade schools, early job sequences, tool usage and identification, safety principles and equipment, hands-on projects. Everyone is to come dressed for work and carrying lunch for the day and notebook. Math and other texts not required on Saturday, unless there is tutoring or questions needing to be raised.

This pre-apprenticeship tutorial has been evaluated by the City Colleges of Chicago and judged to contain the course content equivalent to that of seven college level courses. This course material has been combined in a manner of presentation which allows the student to constantly build on old knowledge and expand into new areas of know-how which will be needed daily in the skilled trades. Thus it is critical that the prospective student plan on attending all class meetings.

We feel the knowledge is manageable in the increments in which it is presented, and individual tutoring is available for anyone interested. Past students, having completed this course, have reported back to us that the classes covered everything on the entry exam that they took to gain employment in the trades.

Trade Specific Seminars -- Schedule of Presentations

Saturday, September 22	**Orientation.** Introduction of a number of tradeswomen, exhibits of their tools and work of their specific trade.
Saturday, October 13	Structural and Ornamental Ironworkers. Afternoon: Material Handling.
Saturday, October 20	Carpenters Barbara Browne and Joyce Sherokow Principles of Leverage, Balance, General Safety lesson, Framing Lesson.
Saturday, October 27	Pipe Fitter Wanda Griffin Heating Systems, Tools & hands-on. Also Tutoring available for Mid-Term. Afternoon: Field Trip to Job Site.
Saturday, November 3	Electricians Melanie Heifetz and Margot Manning Tools, Connections, Conduit Bends.
Saturday, November 10	Cabinetmaker Debbie Parks. Tool presentation, Routers & Laminates. Hands on laminating with veneer or laminate
Saturday, November 17	Field Trip to Operating Engineers Meet at the Office by 9 A.M. to Car Pool.
Saturday, November 24	Continuation of Tool /Safety Lessons. Use of Circular Saw/Mitre Saw/Drill/ Screwgun/ Routers.
Saturday, December 1	Mason Terri Riban. Cement Finishing. Tools of the Trade; Description of Work Safety on the job. Tutoring available for final exam.

(Ap)12